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AMERICAN Journal of Public Health AND THE NATION'S HEALTH

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AMERICAN
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*Livingston, S., and Petersen, D.: New England J. Med. 254:327 (Feb. 16) 1956.

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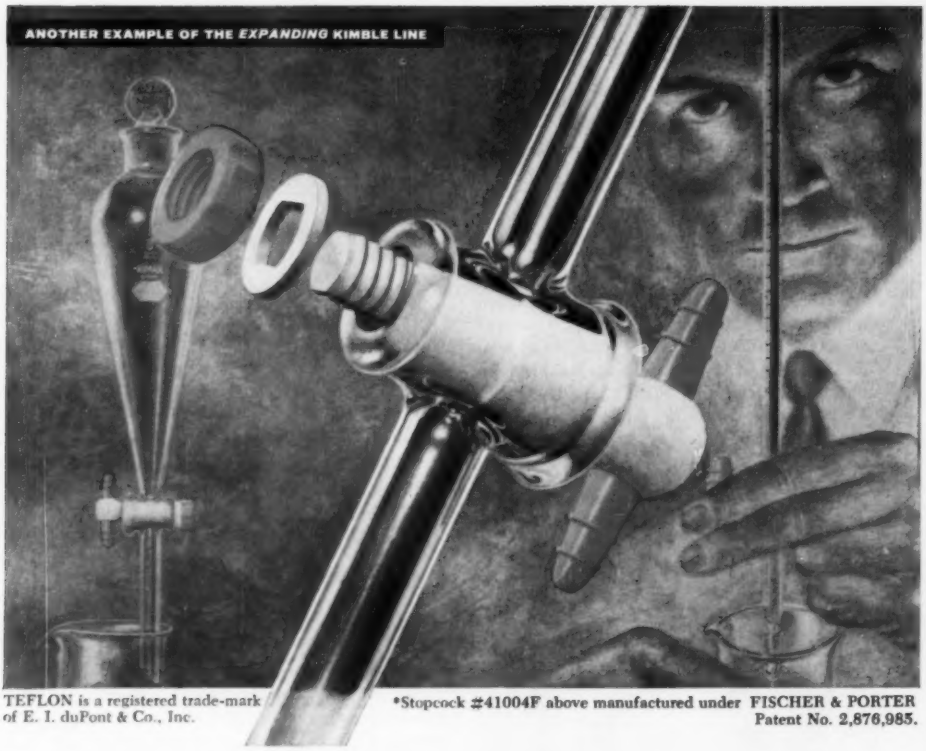

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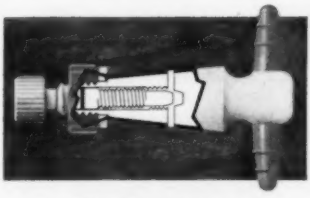

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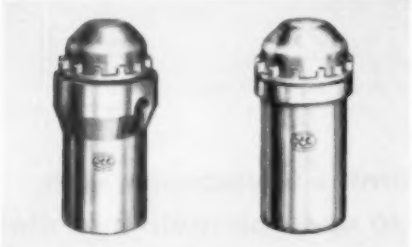

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Coolidge, C. W.; Glisson, C. S., and Smith, A. S.: J.M.A. Georgia 48:167, 1959.

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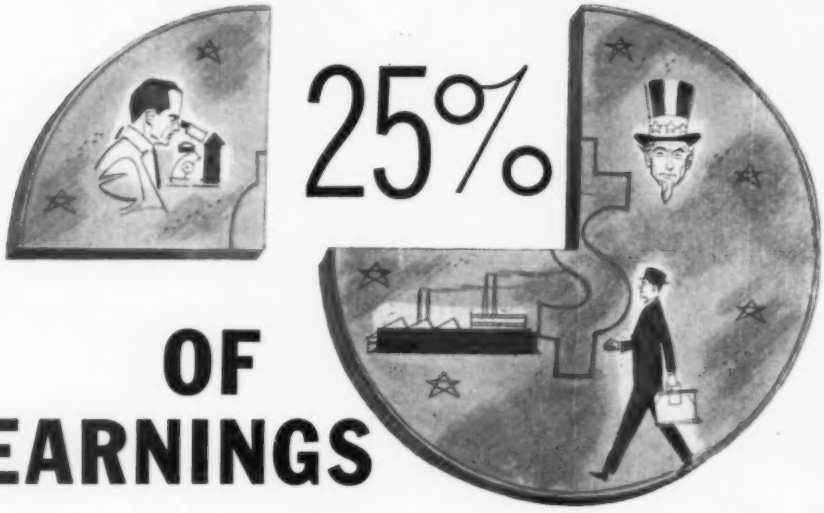

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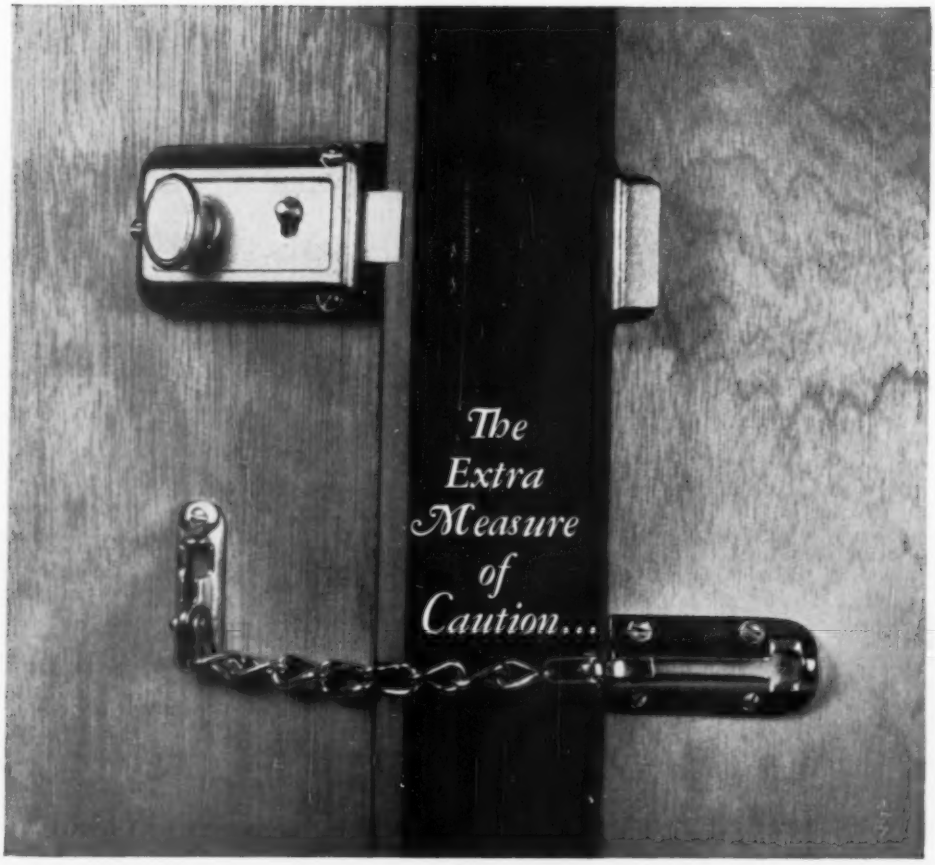

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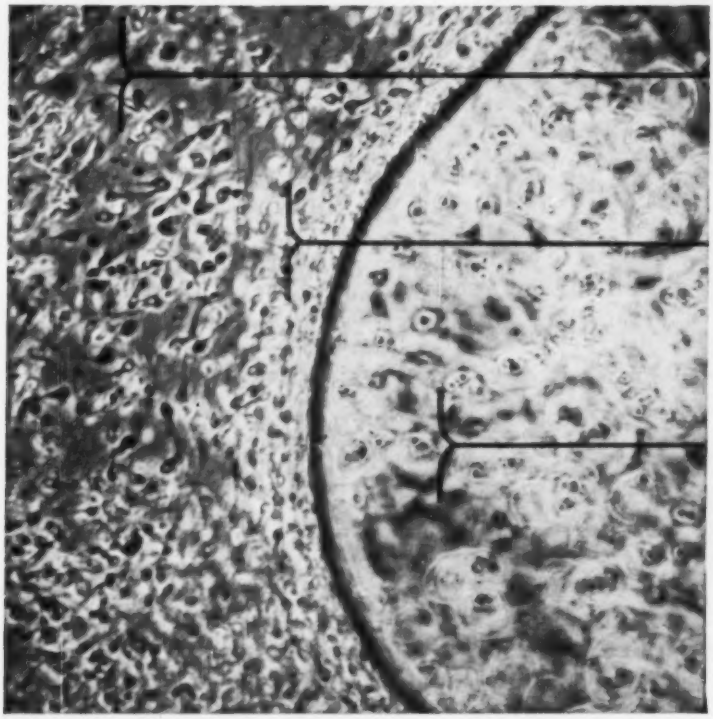

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1. Goldstein, L. Z.: Obst. & Gynec. 10:133 (Aug.) 1957.
2. Finkelstein, R., and Goldberg, R. B.: Am. J. Obst. & Gynec. 78:657 (Sept.) 1959.

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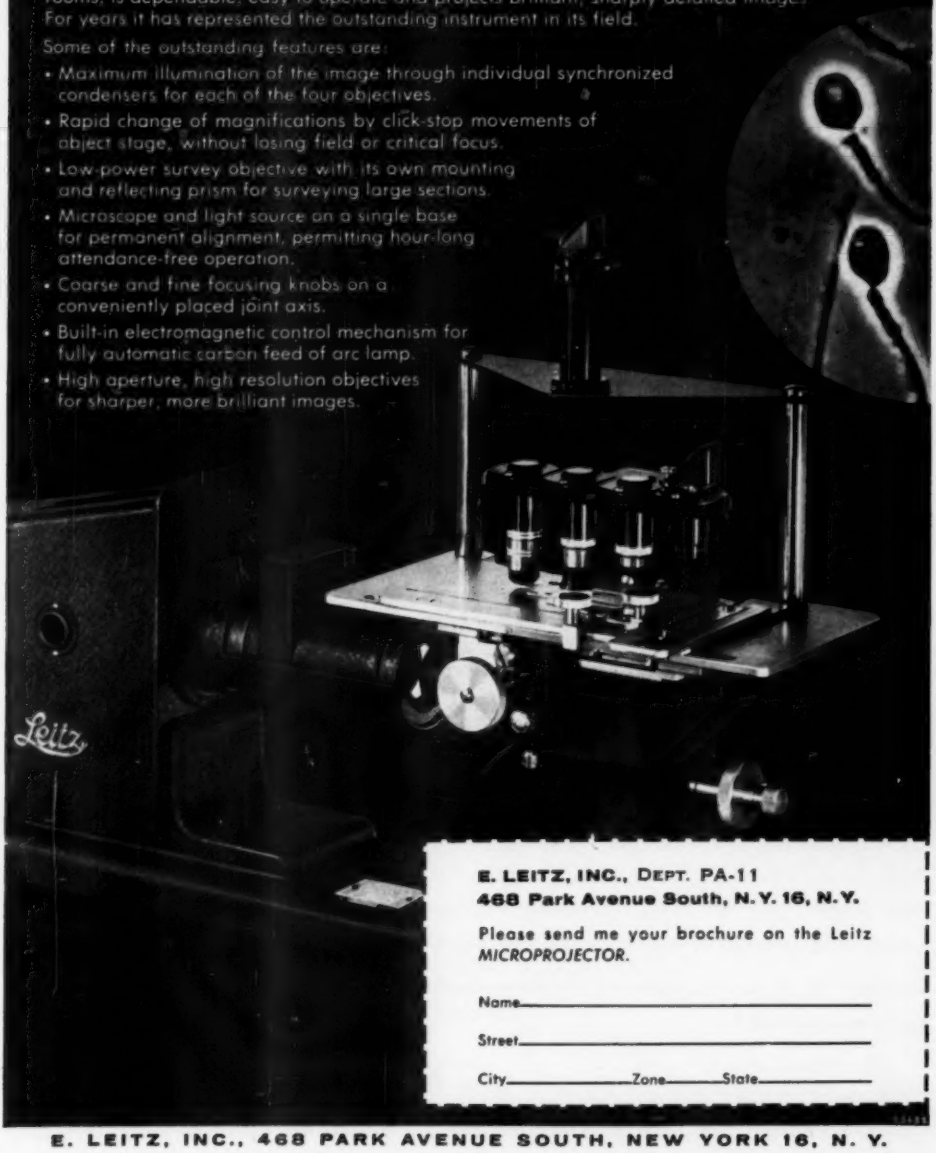

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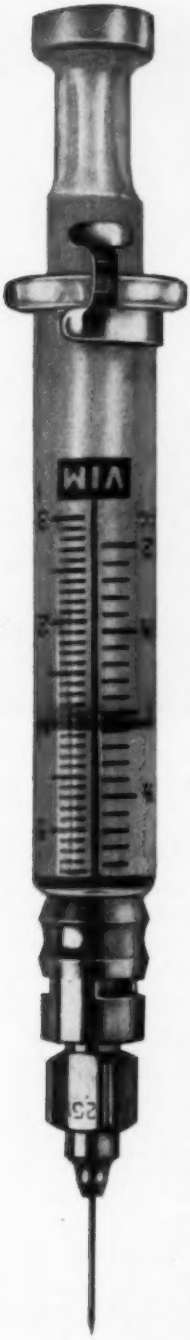

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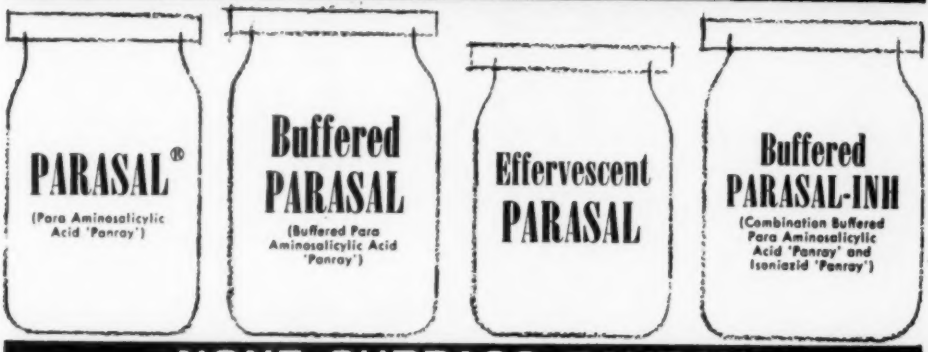

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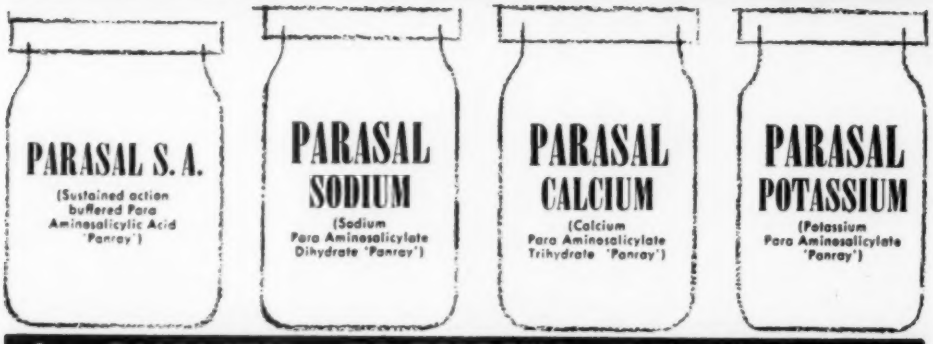

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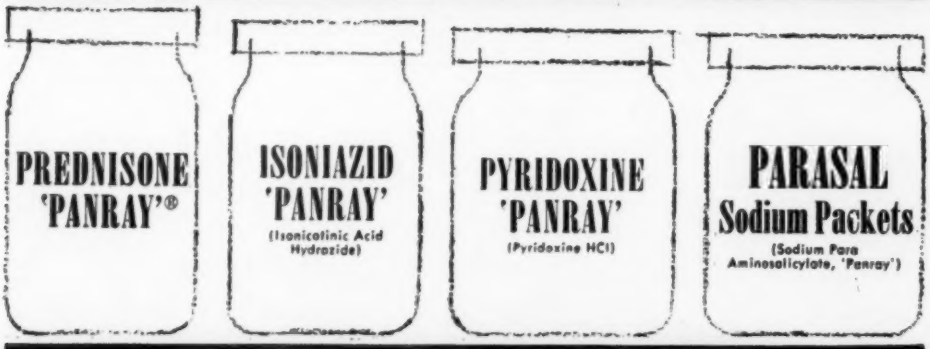

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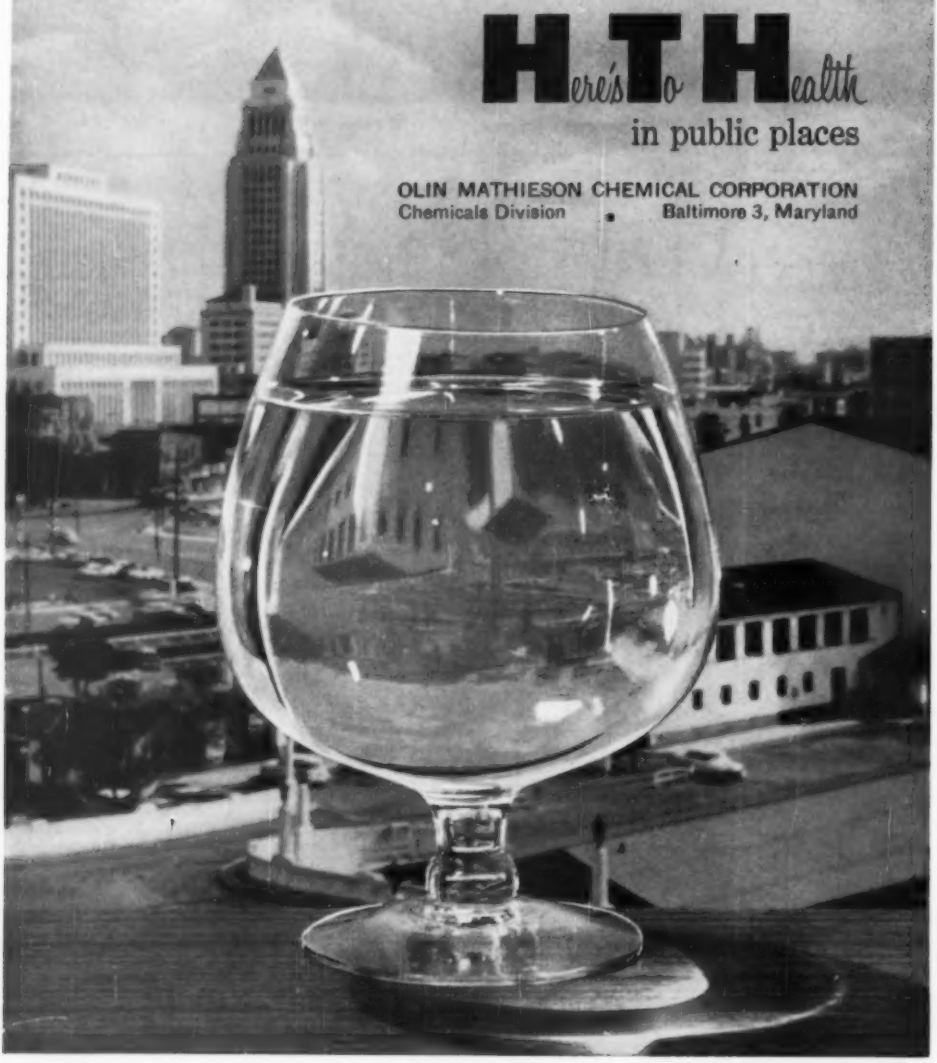

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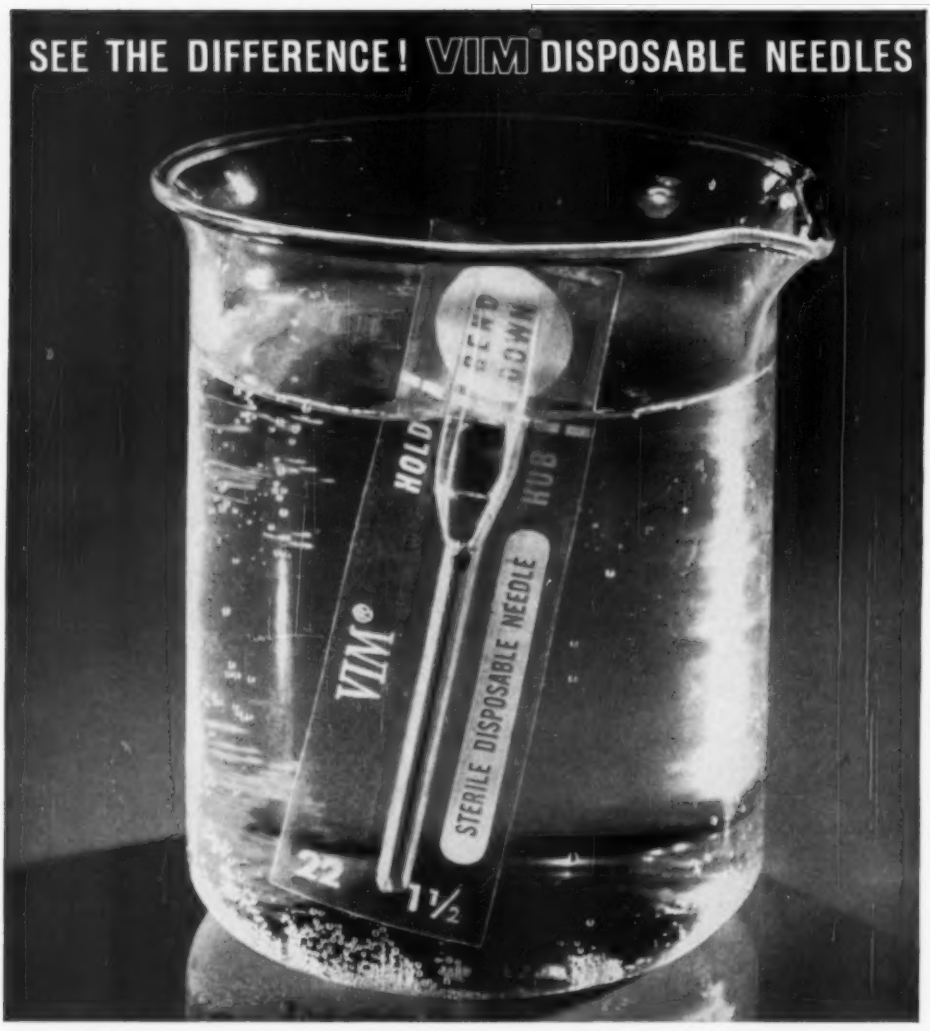

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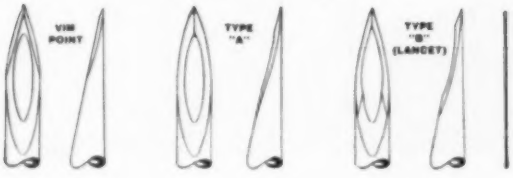

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[1] Shaw, Jas. H., Caries-producing Factors: A Decade of Dental Research, J. Am. Dent. A., 55:785 (Dec.) 1957.

[2] Ludwig, T. G., and Bibby, B. G., Acid Production from Different Carbohydrate Foods in Plaque and Saliva; Further Observations Upon the Caries-Producing Potentialities of Various Foodstuffs, J. Dent. Research, 36:56 (Feb.) 1957.

[3] Bibby, B. G., Effect of Sugar Content of Foodstuffs on Their Caries-Producing Potentialities, J. Am. Dent. A., 51:293 (Sept.) 1955.

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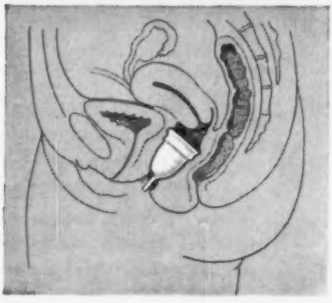

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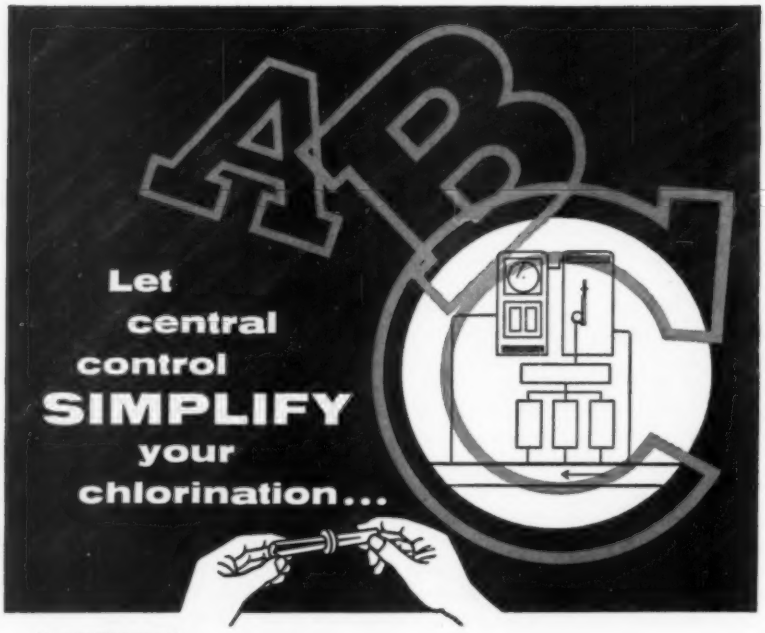

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Journal of Public Health

Inborn errors of metabolism are now receiving increased attention. Some have been recognized as preventable. The three papers presented here discuss the problem, particularly in terms of phenylketonuria, and present ways and means of dealing with this condition as a public health problem.

RECENT DEVELOPMENTS IN INBORN ERRORS OF METABOLISM

David Yi-Yung Hsia, M.D.

THE CONCEPT OF inborn errors of metabolism was first suggested by Sir Archibald Garrod in 1908. In the Croonian Lectures delivered at the Royal College of Physicians he suggested that four metabolic disorders—albinism, alkaptonuria, cystinuria, and pentosuria—had certain features in common. First, in all four conditions the onset of the particular abnormality could be dated to the first days or weeks of life, particularly when a special effort was made to do so. A second characteristic was their familial occurrence in a considerable number of cases. A third feature was that the conditions were relatively benign and compatible with a normal life expectancy. A fourth feature, noted by other clinicians in his day, was the frequency with which these disorders occurred among the offspring of consanguineous marriages.

Half a century later, rapid progress in the basic sciences has given body and substance to what was, by necessity, supposition in Garrod's time. The original four inborn errors of metabolism noted have now been increased to well over 50. We know more, not only about how these conditions are transmitted from one generation to another, but also about the biochemical processes responsible for these changes. My purpose in this paper is to describe these inborn errors of metabolism as public health problems, and this description will be illustrated by a discussion of phenylketonuria and galactosemia.

Phenylketonuria is a hereditary condition characterized by mental retardation and the presence of phenylpyruvic acid in the urine. Nearly 400 cases have been reported from all parts of the world since the first cases were de-

scribed by Folling,[1] a Norwegian biochemist, in 1934.

Though patients with phenylketonuria seem to be ordinary imbeciles, they are noted for unusually attractive features in early childhood. Unlike other mental defectives, they show only a slight reduction in stature and head size, as compared with the normal average of the same age and sex. Many of the children have blond hair, blue eyes and fair skin. A few show a tendency to develop dermatitis or eczema.

Neurologically, phenylketonurics show no paralysis and no changes in muscle tone. However, there is usually a markedly low I.Q. of 30 or less. However, a few high-grade cases with near normal intelligence have been described recently; it is believed that these atypical cases represent less than 1 per cent of all cases of phenylketonuria.

It is estimated that phenylketonuria accounts for about 1 per cent of all mental defectives in institutions. The condition arises once in every 40,000 births in the United States and is transmitted by a rare recessive gene. In any given family with one affected child, the chances of another case occurring in a subsequent pregnancy are one in four, or 25 per cent.

In 1956, we[2] described the detection of the heterozygous carrier for phenylketonuria by means of phenylalanine tolerance tests, in which 0.1 gm per kilo body weight of l-phenylalanine was given by mouth to normal controls and known parents of phenylketonuric children.

One, two and four hours after the initial dose, blood samples were taken for the determination of plasma phenylalanine levels. The results revealed clearly that the parents of phenylketonuric children show a distinct increase in plasma phenylalanine levels following the load, and the level remains elevated for a number of hours thereafter. The degree of overlap between normal controls and heterozygotes is minimal. Subsequent to this work we have been able to carry out the same type of determinations in 200 relatives of phenylketonuric children in some 40 affected families. All these studies indicate that the gene is transmitted as a rare recessive and that the mode of transmission within each member of a given family can be clearly demonstrated. The ability to detect heterozygous carriers in such an abnormality as phenylketonuria obviously has great implications in terms of genetic counseling and in studies of gene frequencies in the general population which are currently being undertaken.

The pathogenetic basis for phenylketonuria is shown in Figure 1. Phenylalanine is converted to tyrosine by the enzyme system phenylalanine hydroxylase. Mitoma and his coworkers[3] have shown that two protein fractions are involved in this reaction: a labile Fraction I, which is present only in the liver; and a more stable Fraction II, found also in the kidney and heart. The system requires dinitrophenyl-hydrazine and iron and the over-all reaction appears to occur in one step, with no intermediates. Recent studies have shown that in phenylketonurics, Fraction II is present in the tissues in normal amounts and that the disease occurs because of a deficiency of Fraction I in this enzyme system.

The deficiency of phenylalanine hydroxylase causes an excessive accumulation of l-phenylalanine in the blood and spinal fluid. This in turn causes three kinds of effects. (1) The excessive phenylalanine is converted, by its transaminase, to phenylpyruvic acid. This in turn is converted to phenyllactic acid, phenylacetic acid, and phenylacetylglutamine and excreted in the urine. For reasons which are still obscure, o-hydroxyphenylacetic acid, m-hydroxyphenylacetic acid, and indole products derived from tyrosine and tryp-

tophane are also found in the urine of such patients. (2) The excessive phenylalanine also inhibits the normal pathways of tyrosine metabolism. There is a decreased production of melanin and this is responsible for the light pigment in the skin and hair of such patients. There is also a disturbance in adrenalin production, since phenylketonurics have unusually low blood adrenalin levels. (3) The excessive phenylalanine or one of its products probably causes some as yet unexplained damage to the central nervous system; this is characterized by mental retardation, epileptic seizures and abnormal electroencephalogram changes.

Thus, the diagnosis of phenylketonuria can be established by the presence of phenylpyruvic acid in the urine and an increase of l-phenylalanine level in the plasma. Phenylpyruvic acid in the

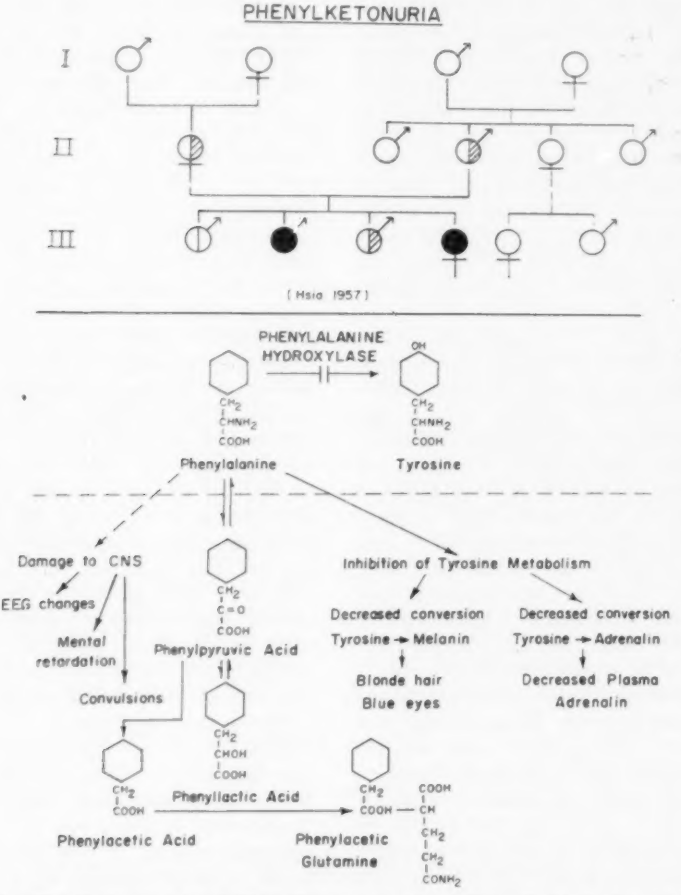

Figure 1—The Pathogenesis of Phenylketonuria (from Hsia, D. Y. Y. Inborn Errors of Metabolism. Chicago: Yearbook Publishers, 1959).

urine can be detected either by the addition of a few drops of 10 per cent ferric chloride solution to an acidic urine, or by the use of Phenistix, a type of test tape.

Phenylketonuria is important because it is the first type of mental deficiency which may be prevented by means of early treatment with a special low-phenylalanine diet. In 1953, Bickel and his coworkers[4] reported the use of a diet low in phenylalanine content which was successful in correcting the plasma phenylalanine levels in phenylketonuric children. The diet comprises a low-phenylalanine protein hydrolysate (which can be obtained from either Merck & Company or Mead Johnson Company), the use of one per cent protein fruits and vegetables; gluten-free bread; sugar and butter or lipomul®; and vitamins and minerals. The diet has been widely used for about five years. As a result of studies carried on in Europe and the United States, a preliminary assessment of the value of such a diet can now be made. It is generally agreed that the diet is of no value to children over the age of six. In those under six, the diet is effective only if the child is started on this mode of therapy at a very young age. We have had a number of children on the diet before the age of six months, and in most cases the I.Q. of these children is considerably higher than would have been expected had they not received such treatment. It should be emphasized that treatment with the low-phenylalanine diet must be rigidly controlled by means of plasma phenylalanine determinations at regular intervals. We have found that the urine phenylpyruvic acid test becomes ineffective when the plasma phenylalanine levels fall below 10 mgm per cent. It is our feeling that such a reduction to 10 mgm per cent is insufficient and that a reduction to 2½ mgm or less should be aimed at.[5]

From the public health viewpoint, the early detection of phenylketonuria represents one of the major challenges created by the progress of biochemistry and medical science in the last few years. It is estimated that one phenylketonuric child will be born out of each 40,000 births. Methods for the screening of all newborn infants at approximately one month of age is desirable to initiate early therapy and thus prevent the need for placing the child in an institution for the retarded for the rest of his life.

Galactosemia is a hereditary condition characterized by an inability to convert galactose to glucose in the normal manner. The disease was first described by von Reuss, a German physician, in 1908. Infants with this condition appear to be normal at birth, but after a few days of milk feeding, they begin to vomit, become lethargic, fail to gain weight, and show enlargement of the liver. Prolonged jaundice during the neonatal period is a common finding. Ascites and edema may develop; and in severe cases death occurs, owing to malnutrition and wasting. Those who survive are usually malnourished and dwarfed at two to three months of age, and mental retardation and cataracts may be discerned. Others may develop cirrhosis of the liver months or years after the acute phase of the disease. In all instances, the signs and symptoms regress after milk and milk products have been taken out of the diet. Laboratory studies reveal the constant presence of a reducing substance in the urine which is not glucose. An excessive excretion of amino acids in the urine is also a common finding.

Galactosemia is transmitted as an autosomal recessive. The defect has been noted among siblings in about half of the reported families, and it would be expected to occur in one out of four births in such families in a normal distribution. In some instances the heterozygous carrier of the abnormal gene

can be detected by means of galactose tolerance tests. Recently, we[6] and other workers[7] have found a decrease of the enzyme P-gal-uridyl-transferase among the parents of such children, as illustrated in Figure 2. It can be seen that the enzyme level using any of the four methods is lower in known heterozygotes as compared with normal controls, while the levels in the homozygote individual are obviously considerably lower, and sometimes absent.

The incidence of the condition in the population is not known. Galactosemia is probably quite rare, with only about 75 cases reported from all over the world. However, in view of the fact that a significant proportion of affected children die in the first few months of life, the actual incidence of the gene in the general population may be higher than originally estimated. At the moment we are undertaking studies to determine the incidence of heterozygotes, in the general population and among the retarded population.

The pathogenesis of galactosemia presents a fascinating story. In 1949, LeLoir and his coworkers[8] showed that galactose is converted to glucose in a series of four separate steps. Each step is catalyzed by a specific enzyme.

The site of the metabolic defect in galactosemia was found by two ingenious experiments. In 1955, Schwarz and his associates[9] in Manchester, England, showed that when milk was given to a galactosemic child there was an abnormal accumulation of galactose-1-PO_4 in the red cells, while this metabolite was not found in normal children. This meant that the block must have occurred somewhere beyond galactose-1-PO_4 and that galactokinase, the enzyme needed for the first reaction, was present in adequate amounts. In 1956, Kalckar and his coworkers[10] in the United States demonstrated that uridine diphosphogalactose-4-epimerase and uridine diphosphoglucose pyrophosphorylase, the enzymes needed for the third and fourth steps, were present in normal amounts in the erythrocytes of galactosemic children. However, P-gal-uridyl-transferase, the enzyme needed for the second step, was barely detectable in ten such children. They therefore concluded that galactosemia occurs as a result of an enzyme deficiency which causes a metabolic block in Step 2 and that all other pathways of metabolism in such patients are normal and intact.

The pathogenesis of galactosemia is shown in Figure 3. The decrease or absence of P-gal-uridyl-transferase results in the accumulation of galactose-1-PO_4 in the red cells, and this in turn is responsible for the accumulation of galactose in the blood. The excessive galactose can have three types of effects: (1) Galactose and galactose-1-PO_4 can accumulate in the tissues and over a period of time are probably responsible for cirrhosis of the liver, cataracts, and renal changes which are also responsible for aminoaciduria. (2) Galactose can be excreted in the urine and easily detectable as a reducing substance. It should be emphasized that galactose will not be detected by a test tape which is sensitive only for true glucose, but

(1) Galactose + ATP $\xrightarrow{\text{GALACTOKINASE}}$ Galactose-1-PO_4 + ADP

(2) Galactose-1-PO_4 + Uridine diphosphate glucose $\xrightarrow[\text{P-GAL-URIDYL-TRANSFERASE}]{}$ Glucose-1-PO_4 + Uridine diphosphate galactose.

(3) Uridine diphosphate galactose $\xrightarrow{\text{URIDINE DIPHOSPHOGALACTOSE-4-EPIMERASE}}$ Uridine diphosphate glucose

(4) Uridine diphosphate glucose $\xrightarrow{\text{URIDINE DIPHOSPHOGLUCOSE PYROPHOSPHORYLASE}}$ Uridine triphosphate + Glucose-1-PO_4

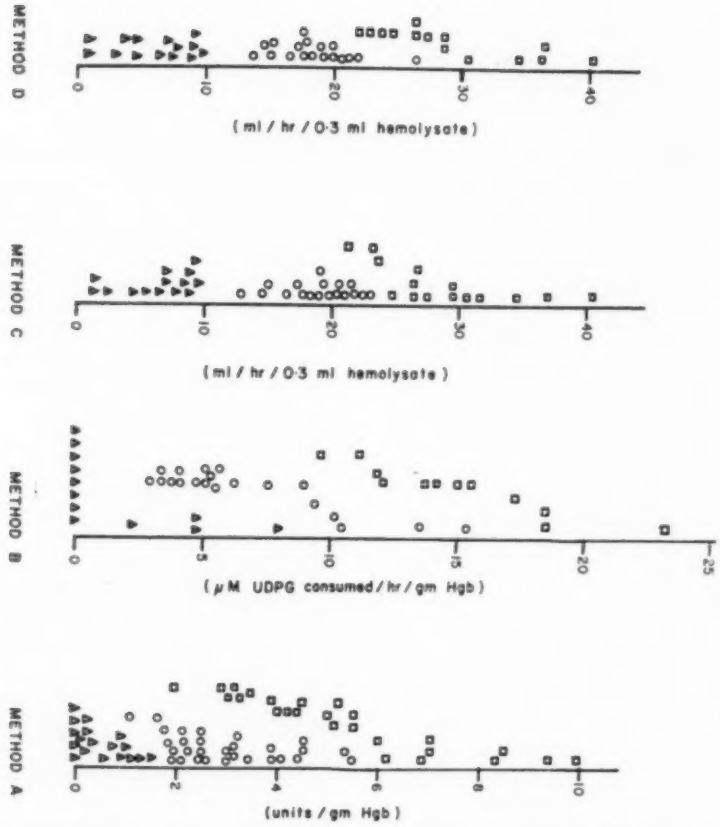

Figure 2—Galactose-1-Phosphate Uridyl Transferase Levels in Normal Controls (Squares), Heterozygotes (Circles) and Homozygotes Triangles Using Four Different Methods of Assay. Methods A and B are Based Upon UDPG Consumption and Methods C and D Upon Oxygen Intake [redacted] (ml/hr should read μl/hr).

it can be detected using a tape for reducing substances in general and it can be discovered by the conventional Benedict test. (3) Galactose depresses the blood glucose level and this in turn may cause convulsions and mental retardation.

Galactosemia can be treated by withholding all milk and milk products, and no additional long-term defects will result if the lactose or galactose is withdrawn from the diet in the first few weeks of life. Nutramigen (R) or protein hydrolysates can be used as a substitute for milk.

As the child gets older, small amounts of milk products can be tolerated without any ill effects. Presumably this occurs because an accessory pathway of galactose metabolism is present in the liver which can convert small amounts of galactose to glucose.

In our own series of 19 children with galactosemia, we know of three cases

which are definitely mentally deficient, five others who are too young to be assessed, while the remainder are normal or above normal in intelligence. Thus galactosemia represents another challenge, not only for survival of the infant, but also for the prevention of mental deficiency.

A total of some 70 such derangements of a hereditary nature are now known and more are being added each year.[11] These defects may in general be divided into four major groups: (1) disturbances in molecular structure, such as the abnormal hemoglobin, sickle cell anemia; (2) disturbances in molecular synthesis, such as the absence of gamma globulin in congenital agammaglobulinemia; (3) disturbances in renal transport mechanisms, in such conditions as cystinuria and cystinosis; and (4) disturbances where the etiology is not known, such as idiopathic hyperlipemia and primary hypercholesteremia.

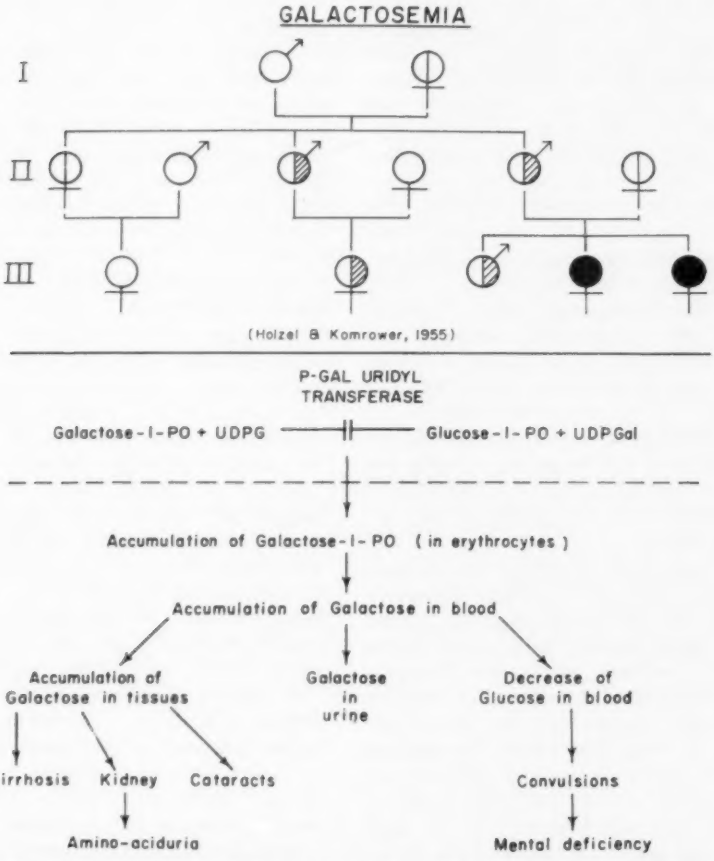

Figure 3—The Pathogenesis of Galactosemia (from Hsia, D. Y. Y. Inborn Errors of Metabolism. Chicago: Yearbook Publishers, 1959).

It is important for public health workers to become familiar with a number of common inborn errors of metabolism which are of potential public health importance. These include cystic fibrosis of the pancreas, where early diagnosis and detection makes possible the prophylactic use of antibiotics and the prevention of chronic pulmonary complications, and may be ultimately life-saving. Another defect recently described is the deficiency of glucose-6-phosphate dehydrogenase, an enzyme necessary for glutathione metabolisms in red cells. About 15 per cent of Negro males and 8 per cent of Negro females are reactors for this defect. In ordinary life, these individuals do not demonstrate this defect, except that when exposed to such hemolytic agents as the fava bean, primaquine, aspirin or sulfa drugs, they will have a severe hemolytic reaction. Another not uncommon defect is idiopathic hyperlipemia, where the individual, both homozygote and heterozygote, tends to have high levels of serum cholesterols and triglycerides. These individuals are unusually susceptible to coronary heart disease at an early age, and the hyperlipemia should be controlled as a preventive measure. In all these conditions the disease process is initiated by the genetic transmission of an abnormal gene, and the clinical symptoms are the result of this abnormality.

It would be interesting to speculate on the future of hereditary diseases as they relate to clinical medicine. First, one might consider the group of hereditary conditions which are primarily morphological in nature. It appears probable that the structural abnormalities in these diseases are the sequelae of a genetically induced chemical abnormality during the early stages of embryonic development. As a result of this insult, the individual is left with a deformity of the bone, eye or muscle. The chemical abnormality is no longer detectable after birth, and we cannot classify such conditions as inborn errors of metabolism in the strict sense. Yet, in their way, these conditions represent a hereditary condition resulting from the chemical abnormality.

At the present stage of our thinking, we cannot be too rigid in defining the lines that separate the morphological disturbances from the functional. For instance, there is increasing evidence that there may be a chemical basis for some of the muscular atrophies. As we learn more about the fundamental processes of transport across cell membranes and the energy mechanisms responsible for these processes, this group of conditions may turn out to be similar to some definitely known chemical disturbances such as cystic fibrosis of the pancreas. Likewise, in such conditions as Fanconi's anemia, the primary disturbance may be morphological and the present evidence indicating a biochemical lesion may turn out to be incorrect.

Next, we might consider the group of biochemical disturbances in which genetics may play an etiological role. On the basis of the presently available information, these disturbances cannot be classified with the hereditary diseases in the classical sense. For example, only about 5 per cent of the brothers and sisters of children who have rickets due to vitamin D deficiency develop this condition. Yet it does not occur in such families with greater regularity than in other families where the diet is equally deficient in that vitamin. In these instances it is difficult to decide to what extent rickets occurs because of inadequate vitamin intake and to what degree it is due to familial tendencies. Similar examples may be found in such conditions as cretinism, familial nephrosis, and idiopathic hypoproteinemia. It appears probable that genetic factors play a role in such

diseases and that they can therefore be regarded as inborn errors of metabolism in the broader sense.

One can carry this reasoning one stage further. The ability of the individual to respond to certain situations may be genetically determined. In an earlier section we have discussed the disturbance in hemolysis which follows the ingestion of primaquine or the fava bean and which is due to a hereditary deficiency of glucose-6-phosphate dehydrogenase. Many similar deficiencies must occur in the human race, but the individuals who have these deficiencies can only be detected when placed in environments with certain stresses. Eventually it may be possible to show that the individual's response to such infections as the common cold or to an overdose of alcohol may be in part genetically determined. Finally, we should bear in mind the large amount of work being done by Williams and others on biochemical individuality. These investigators have found that any given person tends to remain the same from a biochemical point of view throughout his life. He will tend to put out the same amount of lysine in his urine, show the same glucose tolerance curves, and have the same uric acid level from day to day regardless of the diet he is on or the work he is doing. These characteristics distinguish him from other persons who may be the same age, who eat the same foods and work in the same office. Preliminary studies suggest that a person's biochemical individuality may also be in part genetically determined. If so, this represents another approach to our thinking concerning the inborn errors of metabolism in man.

It is apparent that the problems relating to inborn errors of metabolism are far from solved. In fact, we are just beginning to make an intelligent study of this vast and virgin field of medicine. We hope that this discussion will serve its purpose by arousing interest in this area, and that every physician will henceforth ask not only about the specific patient he is treating but also about the family background which may have produced the disease process.

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THE DETECTION AND DIAGNOSIS OF PHENYLKETONURIA

Richard J. Allen, M.D.

Methods of Detection

WE BECAME INTERESTED in the detection of phenylketonuria because such a large number of mentally deficient children were being seen each year in our pediatric clinic. In the past three years 15 patients with phenylketunoria have been recognized. Five (33 per cent) were detected by our staff in spot-checking intellectually defective children. Five others (33 per cent) had been diagnosed by the family physician before we saw them. Three patients (20 per cent) were detected by checking the relatives of known cases, while two children (13 per cent), who had been seen in our clinic, were diagnosed on admission to a state institution for mentally defectives. One of the five children known to have phenylketonuria prior to the clinic visit was diagnosed by a parent who obtained a supply of ferric chloride impregnated paper test strips and tested the child's urine after listening to a lecture given by one of our staff to a parent organization for retarded children. There appears to be a need, then, to encourage everyone coming in contact with retarded children to test for phenylketonuria. Some investigators have also suggested testing the urine of all infants who pass through well baby clinics.[1]

In attempting to spot-check our patients, we found that some were unable to provide a urine specimen during the clinic visit, and because they came from great distances it was impractical to detain them. In many other instances the diagnosis of mental retardation was so obviously due to some other factor (such as brain injury at birth or other perinatal events) that urine testing was not carried out. As an example, one of the children who later proved to have phenylketonuria was exchange-transfused in the newborn period because of an Rh incompatibility. For various reasons, therefore, children with intellectual impairment may not be screened for phenylketonuria. Six months ago we devised and put into use a PKU kit, which consisted of a card with an attached ferric chloride impregnated paper test strip* and typewritten instructions for carrying out the test at home. A stamped addressed postcard with the patient's name and registration number was simply checked "positive" or "negative" by the parent and mailed. In six months 400 kits were given out and 70 per cent were returned, all with negative results. This 70 per cent may well increase because we noted that in several instances postcards were not returned for three to four months after the clinic visit. The feasibility of this method of detection has recently been reported with comparable results,[2] and our experiences with patients under therapy for phenylketonuria indicates

* Currently marketed by the Ames Company, Inc., Elkhart, Ind., under the trade name "Phenistix."

that lay persons can accurately interpret the color changes indicated by this method.

We were also aware that our state institutions probably had some older undiagnosed patients with phenylketonuria. One of our patients detected by spot-checking proved to have a paternal aunt and uncle both of whom had been institutionalized many years ago and who later proved to have phenylketonuria. Six months ago 21 phenylketonuric patients were known to us in seven state institutions with a total population slightly over 11,000. Recently, following further testing, 34 cases have been identified, with the surveys almost 100 per cent completed in four institutions. In five institutions, all new admissions are tested for phenylketonuria. Complete evaluations are frequently limited by the lack of trained personnel, facilities, and so forth to test such large groups. Special teams could eventually screen these institutions, but we believe that Phenistix testing will permit easier examination of all inpatients, since the procedure can be carried out by virtually any attendant, even with uncooperative patients, by simply applying the Phenistix to the wet clothing or bedding. To assist those carrying out such surveys we prepared a brochure with colored photographs of the various testing technics.

With this procedure we hope that eventually complete screening of all institutionalized patients can be achieved. We believe that the majority of the high-risk population can be tested and that this detection of new cases will further encourage the interest of physicians in routine testing for phenylketonuria. Identification of older patients with phenylketonuria is important because virtually all the infants who have been diagnosed and treated in the first few weeks or months of life have had an affected sibling to bring the physician's attention to the disorder.[3-11] Although screening of young, particularly normal infant populations would detect first cases in families, those who have had experience with this technic have found that about 30 per cent of infants escape examination for lack of a wet diaper at the time of the clinic visit.[12] At present, affected individuals are most likely to lead the physician to another case since 68 per cent of the cases have a familial occurrence.[13]

Methods of Diagnosis

The determination of phenylpyruvic acid in the urine remains the simplest method for the quick diagnosis of phenylketonuria. This may be done with ferric chloride, the most readily available reagent in the average laboratory, but it can be confirmed with 2-4 dinitrophenylhydrazine, which parallels the ferric chloride response.[14] The determination of blood phenylalanine levels is generally used by us to confirm the diagnosis and for the long-term follow-up of dietary treatment. As presently performed, the determination of blood phenylalanine as the only method for the detection of phenylketonuria in large population surveys would be impractical.

Ferric chloride added directly to the urine of a phenylketonuric without preceding acidification will result in a deep blue-green color. The green color may be so intense as to lead to misinterpretation, since other compounds such as the urinary metabolites of aspirin and chlorpromazine may also produce very dark color changes.[15,16] However, none of the metabolites, with the possible exception of bilirubin,[17] result in such a characteristic green color. Intense colors from these metabolites on the addition of ferric chloride may incorrectly suggest a positive test but this can then be checked with 2-4 dinitrophenylhydrazine or by determination of the blood phenylalanine. Some of this confusion can be avoided by

dilution of the specimen with distilled water before or after the addition of ferric chloride to 5-10 times the original volume. The resulting green color is quite characteristic. A false negative result may occur if inadequate amounts of ferric chloride are added to large volumes of urine, leading to a cloudy grey color not unlike that seen in some normal individuals. Daily variations in the results of these tests may also occur in some known phenylketonurics,[18] while testing a wet diaper by the direct addition of ferric chloride is not entirely without error.[19] However, if distilled water is added to the diaper and then wrung into a container, ferric chloride added to this portion will give a characteristic green color. Even in the presence of the disease, urinary phenylpyruvic acid may not be detectable in the first few weeks of life.[6,8,20] Therefore, although the ferric chloride test is simple, misinterpretation or individual variations may result in failure to identify a patient with phenylketonuria.

Some newer technics are slightly more costly but appear to minimize technical errors.[21,22] The paper strip method, for example, permits even inexperienced individuals to make the diagnosis of phenylketonuria. Even with these methods, however, color interferences may occur from the ingestion of aspirin, prochlorperazine and chlorpromazine.[2,23]

Since urines are often not immediately available, we have found the commercially available Phenistix as used in our kits useful in testing outpatients. We have also suggested their use in mass screening in Michigan institutions to decrease the need for urine collections and reduce the demand for experienced personnel to interpret the test. Improved diagnostic and screening technics, in addition to the reported methods for identification of the heterozygous carrier,[24,25] may eventually lead to the early detection and treatment of most patients with phenylketonuria.

Conclusion

Based on available statistics, phenylketonuria is a rare disease and is more uncommon than many of the other inborn errors of metabolism.[26] Accordingly, efforts to detect this disease must be simple, easily interpretable, and not too costly in order to avoid ebbing enthusiasm over a period of years as some search for even the first case. Checking infants in our well baby clinic (approximately 3,000 patients per year) would probably require six years or longer for the detection of a single patient if the screening methods were entirely accurate. In areas with large well baby clinics it may be possible to detect one to two cases per year.[1] Also the spot-checking of high-risk populations is subject to error, for morphological appearances may fail to suggest the presence of this disease,[27] while other anamnestic abnormalities, clinical inconveniences and technical errors prevent accurate testing. On the other hand, the mental retardation that accompanies phenylketonuria may be entirely preventable if detected early[10] and it is therefore urgent to establish the diagnosis in infancy if possible, even though present therapy is costly.

We urge a "cross-checking" system between the family physician, the pediatric diagnostic clinic, and the state institution so that in all routine infant examinations and in the evaluation of neurologically defective children, testing the urine for phenylpyruvic acid will always be done. Testing the urine of an infant at the time when routine immunizations are started either in the office or clinic, or at home, with ferric chloride impregnated paper strips would permit early detection. There appears to be no substitute for a high index of suspicion for this disease, and by using

readily interpretable Phenistixs we have often been able to place the mechanics of testing into the hands of the parents so that even the least suspicious patient is tested. Such a system may eventually permit the identification of every case of phenylketonuria in a given area through utilization of a central registry. In the University of Michigan pediatric clinic, the use of phenylketonuria survey cards filled out by the directors of state institutions, the local physicians, and staff members permits rapid estimation of the known number of cases, location of the patient, familial incidence, the degree of intellectual impairment, and the number of patients undergoing treatment. The detailed investigation of all members of the identified families with phenylketonuria in the State of Michigan has not been carried out as yet, with the exception of a few families in our diagnostic unit.

Summary

Fifteen patients with phenylketonuria have been recognized in the Department of Pediatrics at the University of Michigan in the past three years. These have been detected by the combined efforts of the local physician, our staff members, the directors of the state institutions, and their assistants. Our survey in the high-risk population and the pooling of information have permitted identification of a total of 45 patients with phenylketonuria. A PKU kit, utilizing ferric chloride impregnated paper strips, has simplified our search for additional cases in the high-risk group and may also be used in the early testing of well babies.

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The Unified Approach: The Quality of Care

"The medical needs of patients are, after all, multiple. The problem in the individual patient may be predominantly mental, or cardiovascular, or pulmonary. But each patient requires consideration of the less obvious problems he presents. Psychiatric insight is required to evaluate the depression of the chronic cardiac. Specialized experience is required to assess the importance of abnormal chest roentgenograms in a young schizophrenic. . . . Every state hospital requires consultant services from a variety of medical specialties. A unified approach and procedure in obtaining such services offers interesting possibilities for raising the level of medical care. The present separation of these medical facilities by departments and by bureaus hampers their full, effective use in the treatment of patients." ("Report of the Subcommittee on Organization for Health," Committee on Medical Care, Maryland State Planning Commission, June, 1960.)

PHENYLKETONURIA: SCREENING PROGRAMS AND TESTING METHODS

Willard R. Centerwall, M.D.; Robert F. Chinnock, M.D.; and Albert Pusavat, B.A.

WITHIN the last few years it has become apparent that it is possible to prevent phenylketonuric (PKU) infants from becoming mentally retarded—provided they are detected early (within the first few months) and are placed on low-phenylalanine diets.[1] An infant whose treatment is started at one month of age may be expected to develop his full potential. When treatment is started at two months, mentality probably will be normal, but ten points more or less may be shaved off the potential I.Q. In most cases, when treatment is delayed until the second half of the first year of life, the infant will remain somewhat retarded but probably will not need institutionalization.[2] Some young children of preschool age also can be benefited significantly by diet management[3-6]; however, PKU children detected at school age and older are apparently beyond significant I.Q. improvement from present treatment.[7] Yet the discovery of PKU in older mentally retarded children at home or in institutions has great importance. Such knowledge alerts the family and the family physician to the possibility of similar involvement in subsequent siblings or even cousins.[8]

Since we are dealing with a recessively inherited condition, the chance for the normal "carrier" parents to have another PKU infant is approximately one in four (25 per cent). In fact most of the PKU infants to date who have been discovered early enough to receive maximum benefit from dietary treatment have been younger siblings of a family with already diagnosed mentally retarded PKU children. The unfortunate aspect of this method of diagnosis is the sacrifice of the older child before the presence of the disorder in the family is recognized. In each case it would have been a much more satisfactory situation had the older child also been diagnosed in early infancy and received treatment.

Early diagnosis is of such importance that it seems worthwhile to repeat that, for maximum benefit the PKU infant must be diagnosed and treatment must be initiated in early infancy before irreversible brain damage has occurred. To wait for the usual first symptoms of mental retardation to suggest the diagnosis is to wait too long.

This brings us to the importance of the recently instituted routine screening tests for PKU on apparently well infants whereby even the first cases in involved families can be discovered early and mental retardation prevented.[9-13] The value of such a discovery to an involved child and his family is of course immeasurable. The monetary saving to the taxpayers when any such child is spared a lifetime admission to a state institution for the mentally retarded is in the neighborhood of $100,000 for that one child. It is estimated that about 200 PKU infants are born in the United States each year. If each such infant were to be discovered early and thus prevented from becoming mentally retarded and

institutionalized, the theoretical saving to the nation's taxpayers for each year's successful detection would be in the neighborhood of $20,000,000 spread over the lifetime of these children. Thus, it goes without saying that an effective nation wide routine screening program for PKU would be very desirable—especially if it were also both simple and economical.

Screening Programs for PKU

Mentally Retarded Populations

The screening of mentally retarded populations for PKU has been carried on for many years in many institutions for the retarded. In many other institutions, however, such detection efforts are just starting. Although it is unlikely that children picked up by this method can benefit by dietary control, diagnosing older children is such an important way of protecting subsequent siblings that routine screening is being urged in all institutions and schools for the retarded, both public and private.[8] The success of such programs will depend on many cooperating organizations. Case findings will have to be followed systematically into the homes of the families in a way somewhat similar to the screening of families in which an active case of tuberculosis has been found.

A recent home survey of the siblings of 20 PKU patients at an institution of 3,000 population uncovered three previously undiagnosed cases.[8] Two of these were still young enough to receive benefit from treatment. On the basis of this experience several recommendations have been made for follow-up work with the families of PKU patients:

1. The families should be oriented as soon as possible; the orientation should include an explanatory letter or literature that describes the problem. The information should also be forwarded to the family physician. At least one information pamphlet for parents is now available.[14]
2. All siblings should be screened as soon as possible, even if the parents do not think they are retarded. Sometimes retardation in young children is unsuspected by the parents.
3. All newborn siblings should have serum phenylalanine determinations just prior to discharge from the newborn nurseries.* If this is not possible, they should have urine tests at two, four, six, eight and 12 weeks of age.
4. The families should be encouraged to notify other relatives so that young cousins, second cousins, nieces and nephews can be tested for PKU during early infancy.

Well-Baby Populations

In most cases where PKU has been discovered in early infancy, the diagnosis had been made previously in a defective older sibling,[1] as described above. If this were the only means by which young infants with PKU could be identified, it would mean the sacrifice of one child in each involved family.

A more recently instituted type of screening program involves a routine screening test on all infants. This is the only way to find PKU children in previously uninvolved families early enough for the infants to receive maximum benefit from treatment. It is suggested that the test be done at the first three well-baby checkups. Phenylpyruvic acid usually does not appear in the urine until the second or third week of life[15] and in some cases not until six weeks.[1] For this reason there is no value in testing babies in the newborn nursery.

At the present time, many California health departments have joined in a routine screening program for PKU.[9-11]

* We are not aware of any PKU infants who, when tested at 3 days of age, did not already have significantly elevated serum phenylalanine levels. However, until enough cases can be collected to prove that this is invariably true, it is suggested that the urines of infants with normal 3 day serum phenylalanine levels have periodic urine tests during the first several months of life.

The population area serviced by the participating health departments is in excess of three-fourths of the State of California. The program would not be possible except for the full cooperation and enthusiasm of all these health departments. The test being used, called the diaper test, will be described later in this article. As the program is long-range, no final results can be reported at this time. However, it has already been proved that routine testing by this method is easily incorporated into the regular well-baby program, and the simplicity of the test has helped promote the enthusiastic support of the workers in the clinics. Also, it has been proved that the test does uncover cases of PKU.[10,11] Already several PKU infants have been detected by routine screening programs both in the well-baby clinics and by private practitioners. The health departments of several other states have incorporated this type of screening program into their well-child conference programs.

Shortly after the diaper test detection program was initiated in California, a routine screening program was started independently in England. There it is advised that all babies be tested at about one month of age during the first postnatal visit to the clinic or hospital. The screening test now in use is the Phenistix test as a urine or diaper test[13] (described herein).

In Cincinnati, Ohio, a screening program has been started with the so-called filter-paper test[12] (also described herein). In this program each mother with a newborn infant receives instructions along with a piece of filter paper and a preaddressed, stamped envelope. She is instructed that, when the infant is about one month old, the filter paper is to be placed in the baby's diaper until soaked with urine. It is then removed, dried by open-air contact, and subsequently sent via the mails to a medical center.

An Evaluation of Testing Methods Used for PKU

Several tests and modifications of tests are now available for the identification of PKU. In 1958 a study was undertaken at the College of Medical Evangelists School of Medicine to determine, if possible, whether one test had any advantages or disadvantages over another for screening purposes. In this study several thousand evaluations were made on 132 consecutive urine samples taken from 20 untreated institutionalized cases of PKU. The effects of many factors on the urine tests were measured, for example, pH, specific gravity, turbidity, a.m. and p.m. voiding, age and sex of patient, and intervals of time between voiding and testing. Factors such as cost of the test and ease of administration were also compared. More recent evaluations by others are essentially in agreement with our findings.[16]

A more detailed report of this study is in preparation for publication, but the result can be quite simply stated at this time. All the tests studied were comparable in accuracy, and each test had enough specific merits to make it very valuable under certain circumstances (Tables 1 and 2). It was also found that the value of each of these tests is dependent on some simple but specific precautions which if not understood and carried out can easily cut the efficiency of that test considerably. We will attempt to include most of these vital pointers in the following discussion. Because PKU patients on rare occasions will fail to excrete phenylpyruvic acid, it is not wise to exclude the possibility of this disease on the basis of one negative urine test. Also, it should be remembered that the diagnosis is of great concern to the family and involves an expensive, long-term treatment. Therefore, all "positive" urine tests should be confirmed with a phenylalanine blood level before the diagnosis

Table 1—Percentage of 104 PKU Urine Samples Giving Definitely Positive Reactions After Increasing Intervals of Exposure at Room Temperature*

Exposure Time (Hours)	$FeCl_3$ (Test Tube)	$FeCl_3$ (Diaper Test)	Dinitrophenylhydrazine (DNPH)	Phenistix
2	99.1	94.2	100	99.1
4	95.2	93.3	100	98.1
8	95.2	91.3	100	98.1
12	92.3	89.4	100	97.1
18	90.4	84.6	100	96.2
24	76.0	68.3	100	91.3

* Adapted from a report to the Technical Committee on Clinic Programs for Mentally Retarded Children, Washington, D. C., Feb. 26-27, 1959.

of PKU is definitely established. Treatment can be begun on the presumptive diagnosis of two confirmatory urine tests if a phenylalanine blood level cannot be obtained immediately. In such a case, however, a sample of pretreatment serum should be frozen for later phenylalanine determination when this is possible.

The Test-Tube Test with Ferric Chloride

The test-tube test with ferric chloride is the oldest, the best known, and the most widely used of any of the diagnostic urine tests for PKU.[17] The color reaction of ferric chloride with phenylpyruvic acid is practically pathognomonic. Immediately there is a medium-dark blue-green to grey-green color response which begins to fade in a matter of seconds, or minutes, depending upon the concentration of the phenylpyruvic acid in the urine and the strength of the ferric chloride solution being used. This fading of the color response back to a neutral or negative urine color is most useful in differentiating the true phenylpyruvic acid reaction from most so-called false-positive reactions. Ingested salicylates, for example, will give the urine an immediate blue-purple color response upon application of ferric chloride. Unlike the phenylpyruvic acid reaction, however, this color response does not fade away for days. Some of the color responses which can be obtained when a ferric chloride solution is added to urine samples are green from bile, homogentisic acid (alcaptonuria), the catecholamines (pheochromocytoma), and the urine of maple syrup urine disease[18]; red-brown from diacetic acid (acidosis); grey from melanin (malignant melanoma); light violet from chlorpromazine (Thorazine®) ingestion; and purple from proclorperazine (Compazine®) ingestion. Color reactions are fairly stable except with homogentisic acid. In this case the green color is extremely fleeting, disappearing within a second or two. The ferric chloride solution has certain remarkable advantages as a test reagent. It is a simple and inexpensive solution to make. One penny's worth of this solution is adequate to make more than 100 test-tube tests (5 drops to 1 cc of urine each). The green color response is obvious even to the untrained eye. Extensive testing has demonstrated that this is an adequately sensitive and accurate test, yielding only five per cent false-negative tests on PKU urine samples standing four hours at room temperature (Tables 1 and 2).

There are some important points to

remember about the preparation, care and use of ferric chloride solutions:

1. Distilled water is preferable as the diluent for an aqueous solution.
2. A 10 per cent solution is preferred over a 5 per cent solution. The stronger solution gives a quicker, more intense, shorter-lasting color reaction.
3. Stock solutions are best stored in large plastic (polyethylene) bottles, or in large stained-glass bottles, and kept in a refrigerator.
4. Smaller bottles can be filled and refilled as needed from the stock supply. A half-ounce or one-ounce size polyethylene squeeze bottle with dropper nozzle is preferred. Ferric chloride solution will keep nicely in such bottles for many months without refrigeration even in the hottest climates. However, it is probably best, when possible, to keep such solutions away from excessive heat.
5. Ferric chloride solutions will bleach alkali out of some glass bottles and rubber droppers. The result is a cloudy yellow precipitate of ferric oxide, with a correspondingly diminished potency of the solution. Whenever a solution of ferric chloride becomes a markedly cloudy yellow upon being shaken, the solution should be discarded and replaced with a new supply. Since heat hastens deterioration, it is advisable to keep the solution refrigerated when it is not in use, particularly if glass bottles with rubber dropper bulbs are used.
6. The earliest medical literature on the subject, and even the modern-day textbooks, stress that the urine should be acidified before ferric chloride is added. This is not at all necessary if 3 to 5 drops of the 10 per cent solution are added to 1 cc of urine. The marked acidity of the ferric chloride solution (pH 1.8) instantaneously counteracts any excess basicity of the urine. One might run into trouble if one slowly added a 5 per cent solution of ferric chloride to a 5 cc sample of quite basic urine. In such a case, ferric hydroxide might form and could nullify expected results with the phenylpyruvic acid.
7. A definitely positive, immediate color reaction with ferric chloride can disappear on occasion in less than half a minute—thus necessitating observation and evaluation immediately following the addition of ferric chloride. The blue-green to gray-green transient color response is characteristic enough to differentiate the PKU urine from most other so-called "false-positive" reactions. The fact that the ferric chloride reagent will demonstrate the presence of various drugs and unusual metabolites other than phenylpyruvic acid does not impair the value of this test but rather makes it more interesting and more valuable.

The Diaper Test

The diaper test is a modification of the ferric chloride test-tube test. A drop of 10 per cent ferric chloride is placed on a baby's wet (or dried) diaper, and a blue-green to gray-green color appears immediately. The concomitant use of a drop of acid is neither necessary nor desirable. As with the test-tube test, the color is transient. Many

Table 2—Some General Comparisons of Five Current Testing Methods*

	Filter Paper	$FeCl_3$ (Test Tube)	$FeCl_3$ (Diaper Test)	Dinitrophenylhydrazine (DNPH)	Phenistix
Ease of testing	+++	++	++++	++	+++
Ease of interpretation	+++	++++	+++	+++	++++
Low cost	++	+++	++++	+++	++
Sensitivity	++	+++	+++	++++	++++
Other pathology detectable	+++	++	++	++	+

* Adapted from a report to the Technical Committee on Clinic Programs for Mentally Retarded Children, Washington, D. C., Feb. 26-27, 1959.

times a definitely positive test will fade in less than half a minute. Such fading starts in the center of the spot, and the last to fade is the green-rimmed periphery. Whether positive or negative, the spot on the diaper leaves a permanent, tan-colored stain. This is perhaps worth mentioning to the mother. Although thousands of infants have been tested, only a few mothers have mentioned this on a subsequent visit, and these mothers were not disturbed about the stain. When diapers get older, the spot where the ferric chloride is placed is more likely to tear than is adjacent cloth. Again, in practice this has been no problem.

The pointers made earlier concerning the preparation, care and use of ferric chloride solution apply here also. It is possible for the same false-positive reaction to be obtained with the diaper test. The test has proved exceptionally simple to perform and very inexpensive —one penny's worth of solution can test more than 500 infants. The test is also very reliable. Of 104 PKU urine specimens allowed to stand at room temperature for four hours, 97 (or 93 per cent) were still definitely positive by this test (Tables 1 and 2). Trace and one-plus reactions were considered negative; only two-three- and four-plus reactions were considered definitely positive. This was done to eliminate a reasonable objection, that the average relatively inexperienced tester (i.e., nurse or nurse's aid in an office or clinic) might not recognize the most weakly positive tests.

In practice it was found that in a considerable number of cases the infant did not have a wet diaper and the mother had no wet diaper with her. We are now advocating that mothers be instructed to bring along with them on the initial and subsequent clinic visits the most recently wet diaper from home. In this way approximately 30 per cent more infants will be tested who would otherwise miss being tested.

The Phenistix* Test

Another modification of the ferric chloride test is the Phenistix dip stick, a commercially prepared paper strip which is impregnated with a buffered ferric salt.[19,20] This reagent, according to our studies, is second only in sensitivity to the dinitrophenylhydrazine (DNPH) test which will be discussed later. Of 104 PKU urines, 102 (or 98 per cent) were still definitely positive with Phenistix after standing for four hours at room temperature (Tables 1 and 2). This test is excellent for routine screening of apparently well infants because the dip stick can be pressed against the wet diaper or dipped into a urine solution. These sticks are stable almost indefinitely if kept in their special container until used. False-positive reactions do occur with Phenistix but less frequently than with ferric chloride. The color reaction of Phenistix with phenylpyruvic acid is the same as with the test-tube test. The color may also fade away within a minute or so; thus it would be impossible to place a Phenistix in a baby's diaper and expect to come back later and get an accurate test result.

At present the Phenistix costs approximately eight cents a test; this is certainly inexpensive and should be no barrier to those physicians who wish to utilize it as a screening test in their practices. Phenistix is slightly more cumbersome than the "diaper test" for routine screening; on the other hand, it leaves no stain on the diaper.

The Filter-Paper Test[12]

The filter-paper test is performed on ordinary white filter paper which has been wetted with urine, has been dried, and then sent through the mail to the testing laboratory. The test is the same as the diaper test. The difference be-

* The Phenistix used in this study was supplied through the courtesy of the Manufacturer, Ames Company, Inc., Elkhart, Ind.

tween the filter-paper test and the diaper test is that the wet diaper which is tested is probably no more than several hours old, whereas the filter paper urine may be several days old before it is tested.

The question arises, how long does the dried, urine-soaked paper continue to give an accurate test? To evaluate this problem, 30 urines from known cases of PKU were soaked on separate sheets of filter paper, were dried and tested with a drop of ferric chloride. The remaining portion of each filter paper was cut into six smaller pieces and each piece placed in a separate envelope to simulate conditions of the filter-paper screening program. Every day a new set of 30 envelopes was opened and the contents tested. Inasmuch as the program as set up in Cincinnati involves experienced laboratory personnel, even the faintest trace of positive reaction was considered as positive. By the use of such criteria, the 30 specimens initially were all positive, but two of them were only very faintly positive. After three days, the minimum time one can expect between voiding and testing under such a program, three (10 per cent) of the test specimens were negative. At five days, five (16.7 per cent) were negative. After one week, six (20 per cent) were negative. Considering these results, it would be a mistake to take one negative test as assurance that no PKU is present.

The cost per test is approximately 7.5 cents (not including laboratory salaries). This cost could be cut in half if parents would supply their own stamps on the return envelopes. The advantages and indications of filter-paper test program are (1) that the screening program can be initiated in practically all young infants (at least those who are born in hospitals); (2) that this test can be administered to patients in out-of-the-way and distant places and perhaps to infants for whom no wet diaper is available for testing at the office or clinic visit (Table 2).

Finally, this test has special merit as performed by the Cincinnati group because the filter papers are tested also for the presence of protein and galactose. This requires more complex laboratory facilities and equipment and increases the cost, but in turn the discovery of another even rarer mental deficiency syndrome, galactosemia, is made possible. The mental deficiency of galactosemia, like that of PKU, is preventable if detected in early infancy.

The Dinitrophenylhydrazine Test-Tube Test[21]

Properly prepared and used, the dinitrophenylhydrazine (DNPH) reagent is the most sensitive and reliable of the various urine tests for PKU. False-negative test reactions using DNPH on known untreated cases of PKU are very rare (less than one per cent). In our experience with over 100 consecutive urine samples, there were no false-negatives even after 18 hours of standing at room temperature (Tables 1 and 2). Yet because of this very rare possibility, it is advised that urines of mental defectives be so tested on at least two separate occasions, especially in institutions and homes for the mentally retarded, where patients are available and urine specimens more easily obtained. Because other substances rarely found in urine will react to give a positive test with the DNPH, any positive test should be cross-checked with a ferric chloride test. Of the aforementioned substances which can give a color response with ferric chloride, only diacetic acid and the urine of maple syrup urine disease may give positive reactions with DNPH.[18]

To prepare the DNPH reagent, about 4 gm of 2-4 dinitrophenylhydrazine (an orange powder) is added to a liter of one normal hydrochloric acid. This mixture is heated in a hot water bath overnight to make a supersaturated ap-

proximately 0.3 per cent solution of DNPH. The supernatant clear-yellow solution is filtered off and stored in a dark glass bottle. From the larger stock bottle, smaller stained glass dropper bottles can be repeatedly filled for clinical use. Although it is perhaps not necessary, we have kept our stock solutions under refrigeration and have found them to be stable almost indefinitely. A dark granular precipitate sometimes settles on the bottom of a bottle, but this usually goes back into solution if the bottle is shaken.

The test is performed in the following manner: One-half to one cubic centimeter of urine is placed in a test tube. To this is added an equal amount of DNPH. Immediately after addition of the DNPH, the mixture is a clear, pale yellow-orange solution, and it will remain so if the test is negative. The test is positive when in the course of one to five minutes the solution gradually becomes an opaque, bright yellow color. This is a permanent reaction and will be essentially unchanged many hours later. There is a possibility of some confusion in interpreting test results if the urine sample is initially cloudy. When the tester is in doubt, he should duplicate the test and compare the opacities of the older and fresher mixtures, and he should cross-check with a ferric chloride or Phenistix test. It is worth testing a freshly made solution of DNPH against the urine of a known case of PKU. I know of one large state hospital which concluded that the DNPH test was not very sensitive. A check of the solution being used there revealed that it had not been prepared properly and was far from a saturated solution. It is worth mentioning that, like the ferric chloride solution, the cost of chemicals for the DNPH solution is extremely small. By the use of 1 cc of solution for each test, it is possible to make over 200 tests for one penny's worth of solution.

Serum Phenylalanine Determination

The main value and indication for the serum phenylalanine determination is for final confirmation of the diagnosis of PKU in cases seemingly positive by urine tests. No infant or child should be started on the long-term program of a low-phenylalanine diet without a blood sample taken first. This serum specimen can be safely stored in a freezer and tested later if an immediate determination of the serum phenylalanine level is inconvenient or impossible. In this way there need be no long delay in initiating dietary treatment because of a local lack of laboratory facilities.

Relatively few hospitals are set up to make such determinations, not because this is so difficult, but because demands for such tests are so few as to make training of personnel and acquisition of necessary equipment for such procedures impractical for most laboratories. In most large cities commercial laboratories are available where serum phenylalanine levels can be determined at a cost varying from $15 to $30 per determination. Many medical school laboratories also are equipped to perform this test. Anywhere from ½ cc to 6 cc of blood (0.1 to 2.0 cc of serum) will be necessary for this determination, depending on the methods employed by the particular laboratory[22-25] If one is not already familiar with the requirements of the particular laboratory to which one is sending the serum specimen, it is wisest to play safe and obtain a 6 cc blood specimen. This will permit drawing off at least 2 cc of serum, which should be the maximum desired for this determination by any laboratory. When the blood clot has retracted, the serum should be removed and sent to the laboratory for determination. It can be sent by mail in a standard laboratory mailing container. If going any distance, it should be sent by airmail during the early part

of the week so that the sample will not arrive at the week-end and sit in the post office for an extra day or two before delivery.

Sterile technic in handling the serum is indicated. Serum should be sent—not whole blood. A little hemolysis or slight pinkness of the serum is permissible, but the amount of hemolysis which takes place in a whole blood specimen sent through the mails makes test results invalid. A serum sample should be kept in the deep freeze until it is ready to be sent to a laboratory for evaluation. If anticipating delay in transit, send the specimen packed in dry ice. A serum specimen can be safely stored for many months if kept frozen.

Several of the medical centers in the United States doing research in this field have been approached and have expressed willingness to perform serum phenylalanine determinations on specimens sent to them by persons who have no local facilities. The following names and addresses may be used for such purposes:

1. Marvin D. Armstrong, Ph.D.
   The Fels Research Institute
   Yellow Springs, Ohio
2. Helen K. Berry, M.A.
   George M. Guest, M.D.
   The Children's Hospital
   Elland Avenue and Bethesda
   Cincinnati 29, Ohio
3. Joseph A. Garrisi, M.D.
   Department of Pediatrics, School of Medicine
   College of Medical Evangelists
   1720 Brooklyn Avenue
   Los Angeles 33, Calif.
4. Bert N. La Du, M.D.
   Department of Health, Education, and Welfare
   National Institutes of Health
   Bethesda 14, Md.
5. Donough O'Brien, M.D.
   Department of Pediatrics
   University of Colorado Medical Center
   4200 East 9th Avenue
   Denver 20, Colo.

Since none of these centers can guarantee to provide these services indefinitely, it would be wise to verify by a letter of inquiry before sending serum specimens. The desired test and the return address should be clearly stated and postage to cover return mail should be enclosed.

There are two other indications for the use of the serum phenylalanine level other than the final confirmation of PKU cases detected by urine tests. Subsequent siblings born into a family where PKU is present in an older child have a 25 per cent chance of also having PKU. Newborn infants with this disorder have normal cord blood phenylalanine levels; that is, between 1 and 5 mg per 100 ml of serum. By two or three days of age, however, the serum phenylalanine level has risen to abnormally high levels (10 to 15 mg), and a blood specimen at this time is adequate to make the diagnosis.[15] However, it takes a week or longer (rarely up to six weeks) before the serum levels are sufficiently high that phenylpyruvic acid can be detected in the urine. Thus, it is suggested that blood specimens be taken on the newborn siblings of known cases of PKU just before their discharge from the newborn nursery. Babies in a newborn nursery are too young to be urine-tested for PKU. Lastly, it might be advisable to determine the serum phenylalanine level on a child who clinically seems to suggest strongly the diagnosis of PKU but whose urine tests are negative. There are cases of PKU on record whose serum phenylalanine levels, although definitely elevated above normal, are just at the renal threshold level, so that spillage of metabolites into the urine is inconsistent. The clinical findings other than mental retardation which might make one especially suspicious of PKU are blondness, which in 80 per cent of cases exceeds that of the parents and normal brothers and sisters, and an irritable personality pattern. About 25 per cent of PKU children have a history of con-

vulsions and from 20 to 40 per cent have a history of eczema.[20] Also the urine and sweat have a characteristic musty, mousy or barnlike odor which becomes more obvious a few hours after being passed.

Summary

1. A brief background sketch of phenylketonuria (PKU) is made, including the relatively recent knowledge that the mental deficiency of this disease is preventable, provided the diagnosis is made in early infancy and proper dietary management instituted at that time.

2. All mental-deficiency populations should be screened for phenylketonuria, at home, in special schools and in institutions.

3. The families and private physicians of any diagnosed cases of phenylketonuria should be alerted to this condition so that subsequent siblings and cousins will be diagnosed early enough to permit maximum benefit from treatment and so that all siblings of all ages can be tested for this condition. Such orientation is best accomplished when verbal explanation is followed up with appropriate reading material on the subject.

4. Routine screening of all well babies for phenylketonuria is essential if the maximum number of PKU infants are to be diagnosed early enough for optimum benefit from treatment.

5. Three organized screening programs for the detection of infant phenylketonurics within "normal, well-baby" populations are briefly described. Each of these programs, from widely separated geographical areas, utilizes a different method of testing. The hospital newborn nursery is not a suitable place to screen for phenylketonuria because PKU infants rarely give positive urine tests until after the first week of life.

6. Six tests for PKU are outlined and the advantages and disadvantages of each test are discussed. The tests described are (1) the test-tube test with ferric chloride, (2) the diaper test with ferric chloride, (3) the Phenistix (dipstick) test, (4) the filter paper test with ferric chloride, (5) the dinitrophenylhydrazine test-tube test, and (6) the serum phenylalanine determination. The first five of these are simple urine tests. The second, third and fourth tests are particularly suitable for mass well-baby screening programs.

7. All the tests studied are comparable in accuracy and each test has enough specific merits to make it particularly valuable under certain circumstances.

8. The maximum value of each type of test is dependent on some simple but specific precautions and knowledge essential to the reliability of the test. Most of these vital factors are included in the discussions of the respective tests.

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A sample of practicing physicians was studied to see how they chose physicians and surgeons for themselves and their families. The results suggest that the objective characteristics of those chosen to provide care represent criteria for medical care of high quality. Such criteria, according to the authors, may be used by others who wish to obtain medical care of similar quality.

PHYSICIANS CHOOSE MEDICAL CARE: A SOCIOMETRIC APPROACH TO QUALITY APPRAISAL

Milton C. Maloney, M.D., M.P.H.; Ray E. Trussell, M.D., M.P.H., F.A.P.H.A.; and Jack Elinson, Ph.D.

CRITICAL EXAMINATION of existing methods for measuring the quality of medical care reveals that, in the final analysis, virtually all of them rely on professional judgments for their validity.[1-10] Such judgments either set standards against which the medical care facility is compared or estimate the level of performance of the medical care personnel. Although other professions are sometimes called upon, physicians generally are assumed to be the best qualified and most frequently are chosen to make these judgments and set these standards. The study on which we are making a partial report herein accepts this assumption and further assumes that physicians will make their most critical decisions with respect to medical care when they are choosing it for themselves or members of their families. Essentially this is a study of peer judgments in important reality situations where the decision maker is intimately concerned with the outcome. It is therefore a sociometric approach to the problem of evaluating the quality of medical care.

The basic source of data for this report is a personal interview with 468 physicians, constituting 88 per cent of a probability sample of all actively practicing doctors of medicine who were members in good standing of the Medical Society of New Jersey at the time the sample selection was made (September, 1957).

Residents, interns, members of the armed forces and retired physicians were excluded by definition. The total sample, numbering 531, included approximately 15 per cent of all the general surgeons and internists in the state and about 8 per cent of the remaining physicians. Comparison of respondents and nonrespondents on several variables gives no reason to believe that nonresponse has introduced any appreciable bias into the estimates. Furthermore, use of probability sampling methods assures that the estimates of population parameters are reliable within a calculable range of sampling error. Table 1 records certain respondent characteristics by specialty.

This report is limited to those parts

of the study concerned with the characteristics of some of the medical care actually requested and obtained by the respondent for himself or members of his family over a three-year period immediately preceding the interview.

From the interviews a roster of physicians chosen to provide medical care to the respondents or members of their families was developed. Each physician on this roster was sent a mail questionnaire requesting information about certain professional and personal characteristics; 94 per cent responded. In addition, information on many of the questionnaire items was determined by reference to current, readily available biographical sources such as the Directory of the American Medical Association, the American College of Surgeons Directory, and the several State Medical Society Directories, so that in the event

Table 1—Characteristics of Actively Practicing Physicians Who Were Members of the Medical Society of New Jersey in 1958, by Specialty of Physician (in per cent)*

Characteristic of Respondent	All Respondents (N=468)	Respondent's Specialty				
		General Practice (N=133)	General Surgery (N=73)	Other Surgery (N=83)	Internal Medicine (N=104)	Other Nonsurgical Specialties (N=75)
All respondents	100%	100%	100%	100%	100%	100%
Age:						
Under 40 years	25	19	19	29	34	24
40-49	39	44	27	32	40	43
50-59	22	20	29	27	18	21
60 and over	14	17	25	12	7	12
Method of practice:						
Solo fee for service	81	90	88	69	86	70
Partnership, not salaried	10	4	7	20	8	10
Salaried	5	4	1	1	1	14
Diplomate American Board	35	0	35	62	32	68
Length of postgraduate training after internship:						
None	38	63	31	15	34	26
0-2½ years	27	30	9	27	24	30
2½ years and over	35	7	59	57	39	43
Faculty appointment, medical school	11	1	16	13	15	20
Hospital appointment	97	93	100	100	100	99
Director or co-director, hospital department	17	5	19	27	17	25
Membership in professional organizations:						
AMA	93	93	95	95	92	94
FACS	15	†	53	37	2	5
FACP	6	4	0	0	29	3
AAGP	12	31	1	1	6	1
Graduate, foreign medical school	14	19	8	11	13	12
Length of time in practice:						
Under 5 years	16	11	12	21	16	19
5-19 years	49	53	27	42	47	58
20 years and over	36	35	61	37	36	22

* Complete distribution for each characteristic is not shown in all instances; when it is shown, percentage may not total 100 per cent because of rounding.
† Less than 0.5 per cent.

Table 2—Characteristics of the Personal Physician of Various Categories of New Jersey Physicians, 1958 (in per cent)*

Characteristic of Personal Physician	All Respondents (N=192)	Type of Respondent†				
		General Practitioners (N=43)	Diplomated Specialists (N=70)	Nondiplomated Specialists (N=77)	Surgical Specialists (N=70)	Nonsurgical Specialists (N=79)
All personal physicians	100%	100%	100%	100%	100%	100%
Age, 50 years and over	40	51	19	49	40	31
Specialty status:						
Specialist	91	80	94	96	95	95
Specialist, full-time	62	44	67	70	71	66
General practitioner	9	20	6	4	5	5
Information not obtained	15	14	18	11	11	18
Diplomate, American Board	52	30	70	53	57	66
Membership in professional organizations:						
AMA	92	93	88	94	94	89
FACP	41	26	48	44	44	46
Hospital staff appointment	98	95	99	96	100	99
Director of hospital department	24	28	17	27	24	20
Faculty appointment, medical school	20	17	18	26	21	23
Solo practice, fee for service	76	73	78	74	83	71
Specialty:						
Internal medicine	73	38	88	68	75	83
Surgery	14	24	3	10	15	3
Graduate, foreign medical school	4	5	3	4	6	1

* Complete distribution for each characteristic is not shown in all instances; when it is shown, percentage may not total 100 per cent because of rounding.
† Diplomate status of two respondents not recorded.

of nonresponse to the mail questionnaire, data were available to characterize the chosen physician. In addition to being asked the names of the physicians chosen, each respondent was asked questions concerning the episode for which the physician was chosen, his knowledge of the man's objective characteristics, the nature of the personal relationship between them, his reasons for choosing him, and an estimate of the physician's competence.

What, then, are some of the characteristics of the medical care chosen by physicians for themselves and their families? First, the personal physician: When asked if everyone should have a personal physician, nine out of ten of the respondents answered affirmatively. Seven out of ten felt that even physicians should have a personal physician. But only two out of five, or 40 per cent of the respondents, indicated that they had someone whom they considered to be their personal physician; moreover, only one-fifth (18 per cent) of all respondents had seen their personal physician for any reason in the past year.

Table 2 summarizes the occurrence of certain characteristics among the personal physicians by type of respondent. It shows that:

1. Eight out of ten of the men named as personal physicians are self-styled special-

ists. Three-fifths of them limit their practice to their specialty. Only one in ten is a general practitioner.
2. One-half are Diplomates of an American Board.
3. Four out of ten are Fellows of the American College of Physicians.
4. Practically all of the personal physicians have hospital appointments, and one in four is the director of his department.
5. One in five is on the faculty of a medical school.
6. Four out of five are in private practice on a fee-for-service basis.
7. Over 70 per cent of the personal physicians are specialists in internal medicine.

Table 2 also shows that:

1. When a general practitioner chooses a personal physician he is less likely to choose a full-time specialist, a Diplomate or a Fellow of the American College of Physicians than is a specialist.
2. Although a general practitioner is more likely to chose a general practitioner for his personal physician, he does so only one time in five.
3. When the respondent himself is a diplomated specialist, or a nonsurgical specialist, his personal physician is an internist eight or nine times out of ten and a Diplomate of an American Board about seven times out of ten.

Table 3 shows some characteristics of the relationship existing between the respondent and his personal physician, according to the respondent.

1. Sixty-five per cent are close personal friends or have entertained each other in their homes.
2. They frequently refer patients to each other. Four out of five respondents have referred patients to their personal physician and about two-thirds have been referred patients in return.
3. The respondent thinks highly of his doctor's competence: 95 per cent consider him to be above average and one-half consider him to be exceptional.
4. When asked why they chose this particular physician, nearly nine out of ten responded in terms relating to the technical competence of the man. Half of them mentioned personality factors; half mentioned professional contact or personal friendship. Reputation, rank or position and/or membership in professional organizations were referred to infrequently.
5. When asked the professional status of their personal physician, four out of five responded in terms which indicated that they thought him to be a full-time specialist and one-half thought him to be a full-time specialist who was a Diplomate of his respective American Board. One in ten was considered to be both of these and, in addition, a teacher on the faculty of a medical school.

In summary, then, physicians, especially diplomated and nonsurgical specialists, seem to chose as their personal physicians full-time specialists in internal medicine who are Diplomates of the American Board of Internal Medicine and Fellows of the American College of Physicians. They have had long-standing personal and professional relationships with these men and think very highly of their technical competence.

Surgery

Information was collected about all hospitalizations of the respondent physicians and their families during the three years immediately preceding the interview. Of the total reported, 244 were for in-hospital surgery. Table 4 shows some of the characteristics of the surgeon who performed the surgery; Table 5 refers to some of the characteristics of the surgeon-respondent relationship. These characteristics are examined with respect to type and location of surgery. The category "Major Elective" differs from "All Surgery" in that it does not include emergency or ear, nose and throat procedures. It is designed to include surgery about which decisions are perhaps more important and which have been made without the sense of urgency which emergency situations produce.

In considering the location of the hospital at which the surgery was performed, it is assumed that social, economic, geographic and other factors might be expected to influence a physi-

Table 3—Characteristics of the Relationship between New Jersey Physicians and Their Personal Physician, According to Respondent, 1958 (in per cent)*

Characteristic of Respondent-Personal Physician Relationship	All Respondents (N=192)	Type of Respondent†				
		General Practitioners (N=43)	Diplomated Specialists (N=70)	Nondiplomated Specialists (N=77)	Surgical Specialists (N=70)	Nonsurgical Specialists (N=79)
All personal physicians	100%	100%	100%	100%	100%	100%
Resides in same county	82	78	83	84	83	85
Nature of personal relationship:						
Close personal or entertained friend	65	52	73	65	59	77
Not personally acquainted	10	15	7	9	11	5
Known by respondent 10 years or more	55	56	44	65	52	57
Nature of professional contacts:						
On same hospital staff	82	80	82	84	88	77
On hospital staff where respondent trained	17	20	10	20	12	19
Has been referred patients by respondent	82	78	81	88	83	84
Has referred patients to respondent	66	46	78	68	68	76
Estimate of competence:						
Above average	95	93	97	93	95	96
Exceptional	48	43	43	57	56	44
Reasons for selection (multiple):						
Technical competence	86	80	84	92	95	82
Personality factors	48	59	47	41	51	38
Reputation; recommendation	8	2	9	11	11	8
Professional contact or personal friendship	45	48	35	53	48	40
Rank or position	2	0	3	3	0	6
Membership in professional organizations	1	0	1	1	1	1
Perception of professional status:						
Not a specialist	11	24	8	6	5	8
Part-time specialist	7	15	3	4	4	4
Full-time specialist	20	15	19	23	29	15
Diplomate, American Board	52	37	57	60	55	60
Teacher	10	10	13	7	7	13

* Complete distribution for each characteristic is not shown in all instances; when it is shown, percentage may not total 100 per cent because of rounding.
† Diplomate status of two respondents not recorded.

cian to remain in his own community for his medical care. It is further assumed that when a doctor does leave his community, the characteristics of that care must be extremely attractive and desirable to him. In brief, it is assumed that this out-of-community care represents medical care of high quality.

Our data show that 43 per cent of the major elective surgery reported for respondent physicians and their families was done outside the respondent's own county; 31 per cent was performed in hospitals outside the state of New Jersey. There is no information on the frequency with which nonmedical people leave New Jersey for their surgery but over one-half of the respondents agreed that physicians are more likely than nonphysicians to do so. When asked the reasons for this, two-thirds gave as the main reason (and the most frequently mentioned) the physician's greater awareness of better facilities and more qualified doctors outside the community.

What are some of the characteristics of the surgeon chosen by the respondents to operate on them or on members of their families? Table 4 shows that:

1. Nearly all are surgical specialists; 80 per cent limit their work to their specialty.
2. Not a single general practitioner was identified as having performed surgery on a respondent or a member of his family.
3. Two-thirds of all chosen surgeons were Diplomates of their respective American Board; among surgeons chosen outside of New Jersey, 87 per cent were Diplomates.
4. Two-thirds of all chosen were Fellows of the American College of Surgeons; four-fifths of those practicing outside of New Jersey were Fellows.

Table 4—Characteristics of the Surgeon Chosen by New Jersey Physicians, by Type of Surgery and Location of Hospital Where Surgery Was Performed, According to Surgeon Chosen, 1958 (in per cent)*

Characteristic of Surgeon	All Surgery (N=244)	Major Elective Surgery		
		All (N=155)	Location of Hospital	
			In N. J. (N=105)	Out of N. J. (N=50)
All surgeons	100%	100%	100%	100%
Location of practice—not in N. J.	24	31	0	100
Graduate, foreign medical school	9	7	8	3
Method of practice:				
Salaried	5	8	2	26
Partnership	16	18	20	15
Specialty status:				
Surgical specialist	95	96	96	97
Surgeon-specialist, full-time	77	80	77	86
General practitioner	0	0	0	0
Diplomate, An American Board (surgical specialty)	67	68	60	87
Membership in professional organizations:				
FACS	64	66	59	82
FACOG	9	15	12	22
AAGP	0	0	0	0
Faculty appointment, medical school	26	33	18	77
Director of hospital department	32	38	32	49
Operated in hospital with 500 or more beds	14	19	1	61

* Complete distribution for each characteristic is not shown in all instances; when it is shown, percentage may not total 100 per cent because of rounding.

Table 5—Characteristics of the Relationship between New Jersey Physicians and Their Surgeons, by Type and Location of Surgery, According to Respondent, 1958 (in per cent)*

Characteristic of Respondent-Surgeon Relationship	All Surgery (N=244)	Major Elective Surgery		
		All (N=155)	Location of Hospital	
			In N. J. (N=105)	Out of N. J. (N=50)
All surgeons	100%	100%	100%	100%
Nature of professional contacts:				
On same hospital staff	67	60	80	15
Respondent has referred patients to surgeon	69	66	74	47
Surgeon has referred patients to respondent	37	34	45	9
Surgeon on hospital staff where respondent trained	17	18	15	27
Perception of professional status:				
Not a specialist	2	2	2	0
Part-time specialist	3	3	3	3
Full-time specialist	19	19	26	3
Diplomate, American Board	53	44	59	10
Teacher	21	31	8	82
Nature of personal relationship:				
Close or entertained friend	26	27	33	16
Not personally acquainted	25	33	23	56
Known by respondent 10 years or more	32	31	34	24
Estimate of competence:				
Above average	89	90	90	90
Exceptional	48	51	46	62
Reasons for selection (multiple):				
Technical competence	77	76	83	65
Personality factors	34	35	39	28
Reputation; recommendation	19	19	9	39
Personal friend or acquaintance	37	39	40	35
Rank or position	5	8	4	9
Membership in professional organization	1	1	1	1

* Complete distribution for each characteristic is not shown in all instances; when it is shown, percentage may not total 100 per cent because of rounding.

5. When the surgery was done outside of New Jersey, eight out of ten surgeons were on the faculty of a medical school and one-half of them were directors of their departments.
6. One surgeon in four was in the salaried practice of medicine in the out of New Jersey group.
7. Three-fifths of the out of New Jersey procedures were done in hospitals of over 500 beds.

Table 5 shows that:

1. Ninety-five per cent of respondents considered their surgeon to be at least a full-time specialist.
2. When the surgery was performed outside of New Jersey, four out of five respondents considered their surgeon to be a full-time specialist and, in addition, a Diplomate of his American Board and a teacher in a medical school.
3. Nearly all surgeons were considered to be above average in competence; one-half were considered to be exceptional.
4. Nearly four out of five respondents mentioned technical competence as a reason for selecting the surgeon, although somewhat fewer mentioned it when the surgeon chosen was outside of New Jersey.

In summary, the physician's surgeon is highly specialized in his field, a

Diplomate of his American Board, and a member of the American College of Surgeons. When consulted outside of the patient's own community, he is usually a teacher working in the hospital of a medical school and is generally the director of his department. He is on a salaried arrangement far more frequently than is the physician who seeks his aid. He is never a general practitioner. He is highly regarded by his patient although not as well known to him as is his personal physician. He is more frequently chosen for his reputation and less often for direct knowledge or appraisal of his technical competence than is the personal physician.

Finally, Table 6 records the professional status of the anesthetists who gave anesthesia to this sample of patients. Nine out of ten were physicians when the anesthesia was for surgery, three-fourths when given for obstetrics.

Conclusion

A respresentative sample of actively practicing physicians who were members of their state medical society has been surveyed with respect to their choice of medical care for themselves and families. Such care represents selection by experts in a situation in which the chooser has a considerable personal interest. Examination of the characteristics of the care chosen under these circumstances indicate that perhaps physicians are shifting their points of view on certain much-discussed issues such as regionalization of medical care, the effect of the method of physician remuneration on quality, and the relationship between degree of specialization and the granting of in-hospital surgical privileges. It is suggested that the objective characteristics of the medical care chosen by physicians for themselves and their families represent care of high quality and that they can be used as reassuring guide lines by other groups who are seeking care of similar quality or who wish to estimate the quality of the care which they are presently receiving.

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Table 6—Professional Status of Anesthetists Giving Anesthesia to New Jersey Physicians or Members of Their Family by Type of Care Requiring Anesthesia, 1958

Professional Status of Anesthetist	All Cases		Type of Case				
			Surgery		Obstetrics		Accident-Injury*
	No.	%	No.	%	No.	%	No.
All Anesthetists	310	100	211	100	90	100	9
Physician	262	85	188	90	67	75	7
Nurse	26	9	11	5	15	17	0
Do not know	22	6	12	5	8	8	2

* Per cent not calculated for this type.

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Future Development of Services and the Government

"In view of the growing health needs of our population, it might be well to emphasize several points regarding the future development of services and the role of government.

"First, government should perform necessary health functions in both preventive and treatment services only to the extent that they are not and cannot be made available through individual or community (nongovernmental) resources.

"Second, the services performed by the various levels of government should complement each other. As a general rule local government should be the unit to develop, or recommend the development of, new services, since it is in the best position to determine local needs. Establishment of state-wide public health standards and a qualitative review of local and regional services should be made by the state, with the advice and assistance of local government. . . .

"Third, the ability of local health units to cope with the many health problems would be enhanced if each unit had a board of health to provide competent guidance in the various health fields, particularly with respect to preliminary planning and program evaluation. Such boards would benefit from citizen representation. . . .

"If the state follows these three points, there can develop an orderly health system where the various levels of public health services complement each other and in turn supplement the other services available in the community at large." ("Report of the Subcommittee on Organization for Health," Committee on Medical Care, Maryland State Planning Commission, June, 1960.)

In the study of homes for the aged reported below, mental impairment was the most common affliction of the persons investigated. Factors responsible for this situation and means of dealing with it are analyzed and discussed. The importance of the problem makes the reading of this paper essential.

MEDICAL CARE OF THE MENTALLY IMPAIRED IN HOMES FOR THE AGED

Franz Goldmann, M.D., F.A.P.H.A.

THE ROLE of homes for the aged in meeting the health needs of senior citizens has been little explored in this country despite the fact that the population of such institutions is substantial. An opportunity to enlarge the meager knowledge of this subject arose in connection with a large-scale inquiry into the problem of coordinating health services for patients with long-term illness, a project conducted under the auspices of the Council of Jewish Federations and Welfare Funds and supported by a grant from the Public Health Service, Division of Hospital and Medical Facilities. As part of this undertaking, cross-sectional case studies covering 530 residents were made at five Jewish homes for the aged located in Chicago, Miami, Philadelphia, St. Louis and Toronto; and descriptive material on organization, functions and relationships was collected from 70 Jewish homes for the aged in the U.S.A. and Canada.

The case studies were designed to define the health needs of the residents; to determine both the services currently rendered to them at the homes and the referrals to other resources during the six months preceding the time of the study; and to evaluate the adequacy of the current provisions in relation to the physical and mental conditions of the residents. The studies were carried out in the spring of 1958 on the basis of a one-day census. For each resident a detailed statement of facts and judgments was completed by a team consisting of a physician, a nurse and a social worker or administrator of the home. All study teams used for their reports a uniform schedule designed by the director of the health study.

The information on organization, functions and relationships of the homes was obtained through extensive questionnaires that were completed by 70 of the 79 institutions known to exist and, as requested, described and commented upon the situation prevailing in 1957.

The composite picture drawn from the findings shows three outstanding features: (1) Almost all residents are in ill health and have multiple chronic ailments; many are substantially dis-

abled. (2) Mental impairment with symptoms of temporary or continuous confusion is the most common affliction and marked emotional disorders are widespread among the 530 persons studied. (3) Most of the Jewish homes for the aged perform the functions of high-grade nursing homes and emphasize both comprehensiveness of health service and teamwork. They employ regular staffs composed of a large variety of persons with special skills; they own diagnostic and therapeutic equipment or have ready access to it in cooperating hospitals; they maintain special units for the sick and, except for a few homes, they have more or less definite arrangements with general hospitals for inpatient and outpatient care of those residents who cannot be treated at the home.

The Residents

The people living in the five homes studied belong to that unfortunate group of senior citizens who have not achieved the dream of growing old gracefully. They were forced to seek refuge in an institution because of failing health in combination with unfavorable socioeconomic circumstances, such as unsuitability of their own home for care, lack of close relatives or serious difficulties in living with them, or inadequate financial resources. To them, the term "golden age" sounds Shiperian.

At the time of the study the median age of the 530 residents was 80 years and women far outnumbered men; three out of four residents were widowed and the majority of the others were divorced, separated, or single; eight out of ten were dependent for their support on public assistance, Social Security benefits or both; and three out of ten had been living in the home more than five years.

Almost all residents were plagued by advanced infirmity or prolonged illness. Different health conditions requiring service at the time of the study averaged close to three per person. The predominant cause of impaired health was arteriosclerosis in its various manifestations. Mental confusion was found in more than four out of ten residents studied—milder forms in nearly every fourth and serious disturbance in nearly every fifth resident. Incontinence, mainly neurogenic, was observed in one out of nine residents. The great majority of the mentally confused residents—three out of four at the time of the study—required constant supervision and much nursing service; therefore, they had to be assigned to special units, such as infirmaries or hospital sections. Furthermore, many mentally clear residents had marked emotional disorders. All told, at least two-thirds of all residents needed continuous special attention due to substantial damage to their mental health, not to mention others with occasional or minor symptoms of abnormal behavior. Small wonder that one of the administrators commented, "My 'home' is a mental hospital."

The age distribution of the residents with emotional or mental disorders reflects the age composition of the home population. At the time of the study, more than half of these people were in the age group 80 years and over and quite a few nonagenarians were among them. Most of the younger ones were between 70 and 79 years.

The predominant symptoms of emotional or mental disorder were anxiety and confusion. Anxiety was usually associated with clearly definable physical diseases or consequences of accidents, such as Parkinson's disease, cardiovascular disease, skin disease, impending blindness or deafness, and fracture of the femur. Frightened by life's lengthening shadow these oldsters reacted in various ways. Some were constantly clamoring for the nurse, the doctor, or the social worker, some were

awake most of the night, some became violently angry over suggestions for treatment, some tended to withdraw, and some had depressive phases. Mental confusion was most frequently one of the various symptoms of generalized arteriosclerosis, cerebral arteriosclerosis or cerebral hemorrhage; in a small percentage of cases it was attributed to involution. The principal clinical manifestations were noisiness, aggressiveness, untidiness, agitation, hallucinations, paranoid ideas, depression and complete clouding of consciousness.

Ranking second in frequency were symptoms indicating difficulties of residents in adjusting to congregate living. These ranged from quarreling with roommates, domineering behavior and constant complaining about everything to stubbornness, resentfulness, hostility, withdrawal, and occasional episodes of depression. In some instances, these behavioral disorders were reactions to the change from the accustomed life to an environment neither desired nor liked, in other instances they were probably aggravations of old personality difficulties under the emotional stress of progressive physical deterioration.

Relatively uncommon were clinical manifestations ascribed to the decline of intellect and personality in persons without discernible physical disease. They ranged from forgetfulness, apathy, apprehensiveness, quarrelsomeness, sexual misbehavior, untidiness and a tendency to wander away, to paranoia, violence, depression with suicidal attempts, and complete disorientation.

Personal Health Services

All five homes maintain, or have ready access to, special facilities for the care of sick or seriously impaired residents and to diagnostic and therapeutic equipment of various kinds. They have regular staffs consisting of professional and auxiliary personnel, they foster a constructive approach through health supervision and treatment aimed at best preservation of functional capacity possible, and they emphasize teamwork of representatives of various disciplines.

The beds specifically assigned for the care of the sick in the five homes made up 44, 23.7, 48, 60, and 24 per cent of the total bed complements of 84, 135, 174, 250, and 287, respectively. Clinical laboratories, x-ray laboratories, electrocardiograph machines, operating rooms suitable for minor surgery, dental divisions, and equipment for physiotherapy and occupational therapy were owned by four homes and were easily available to the fifth home located in the same building with a hospital for chronic diseases.

The staffs of all five homes comprised physicians, dentists, laboratory technicians, nurses, physiotherapists, social workers, and recreation workers. Other health personnel available to the residents in most instances included podiatrists, optometrists, and occupational therapists, and, in one instance, a psychologist.

The medical staff consisted of part-time physicians at all homes and, in addition, full-time physicians at two homes. The time spent on medical service at the homes during a typical week was equivalent to 12 to 40 hours per 100 residents, with 25 to 30 hours the prevailing pattern. All major medical specialties, including psychiatry, were represented on the regular staffs of the five homes. Psychiatrists gave two to four hours of service a week at four homes and one hour a week at one home that was visited by a psychologist once a week for two hours. Psychiatric clinics were routinely held at three homes and, in addition, psychological clinics at one home.

The nursing personnel was largely composed of practical nurses and aides, with a small complement of professional

nurses for direction, supervision and services requiring high skills. The number of all types of nursing personnel was equal to one for every nine residents in the least adequately staffed home and to one for almost every three residents in the home with the largest staff. Professional nurses ranged from one for every 70 residents to one for every 20.

The staff psychiatrists took care of more than one-third of the patients with manifestations of emotional maladjustment or mental impairment. Regular weekly patient interviews were most common, being conducted for close to one half of the residents under psychiatric care. Next came regular reviews, attendance as needed, and monthly or bimonthly checks or one-time reviews. The patients receiving regular weekly treatment were mostly disoriented persons, including many with paranoia, agitation or depression and some who were more or less constantly confused. The minority were mentally clear and were suffering from serious anxiety over physical conditions such as coronary insufficiency, hypertension, severe herpes zoster or pulmonary emphysema. The regular reviews were made mainly for mentally clear patients who were noisy, argumentative, irascible to the point of fighting with anybody, apprehensive, or depressed by the course of their physical condition; occasionally such reviews concerned "pitiful vegetables."

Two-thirds of the residents with emotional or mental disorders could be helped through counseling by social workers and constant reassurance by the nursing personnel, with occasional psychiatric consultation. In general, the social workers dealt with mentally clear residents who were fearful, complaining, demanding, cantankerous, bellicose or antagonistic.

What has been said about the health conditions of the residents and the organization of personal health services at the five homes applies in principle to the great majority of all Jewish institutions for the aged. As the survey of 70 homes shows, provision of a wide range of personal health services is the prevailing policy. Psychiatrists are in attendance at the majority of these institutions; they hold regular weekly sessions, come in for consultation or treatment as needed, or do both. For the year 1957, regular weekly service by psychiatrists was provided by 22 homes, 19 of which had one psychiatrist each, two had two psychiatrists each, and one had a special department of ten physicians, including six accredited psychiatrists and neurologists. The amount of time spent on these services differed from home to home. In most instances, it lay somewhere between one and eight hours per week, in one instance it was less than one hour, and at the home with the large staff it reached 49 hours a week. Visits of psychiatrists for consultation, treatment or both during a given month of 1957 were reported by 34 homes.

There is good reason to assume that the data given before understate the situation. According to reports from 63 homes, psychiatrists ranked second in frequency, after ophthalmologists, among the specialists who had been in attendance during a given month of 1957. Furthermore, it is significant that psychologists were regularly utilized by five homes.

Provision for direct service by psychiatrists and psychologists is not the only forward step taken by Jewish homes for the aged. In 1957, opportunities for training in geriatrics were offered to interns and residents of mental hospitals by four homes, and to students of nursing and psychology by five homes; and clinical research on psychiatric or psychological aspects of the problems of the aging was in progress at nine homes.

Experience

The experience gained at the homes with relatively advanced provisions for psychiatric service permits four general statements on the value of psychiatric orientation of personal health services at institutions for long-term care:

1. Many residents who enter the home with symptoms of mental impairment or who find it hard to adjust themselves to the new environment can be successfully treated. Illustrations from the case studies are a 70-year-old woman, irrational at the time of admission, who very soon was able to move freely about the home and eat in the common dining room; a bitter 87-year-old who was constantly complaining when she was first admitted but who was physically stronger and emotionally adjusted at the time the study was made; an 85-year-old woman admitted with malnutrition and marked "senility" who responded so well to good care that she was described as "an excellent example of marked clearing of senile changes."

2. Patients with psychosomatic disorders can be handled effectively without resorting to a battery of laboratory tests and an array of examinations by specialists. For instance, the "irascible old fellow" who time and again had fights with residents and immediately afterward went to bed with all sorts of complaints about physical ailments was promptly relieved of all his aches and pains, although not of his quick temper.

3. Disoriented residents can receive intensive care in suitable physical facilities. For quite a few, at least temporary improvement can be achieved, with the result that transfer from the infirmary to the residential unit is possible. For others, the agony of the last illness can be mitigated.

4. Referrals to mental hospitals can be reduced so much that they become exceptions. There is ample support for the general validity of Goldfarb's experience that "patients who formerly have been considered intolerable, unmanageable, or risky were well handled without locked doors or barred windows. . . ."[1] Unquestionably, well-organized psychiatric service in homes for the aged can go far to free beds in mental hospitals.

Comments

By accepting responsibility for systematic organization of personal health services, the Jewish homes for the aged, with few exceptions, have demonstrated their willingness to adjust their functions to new requirements and their readiness to make good use of the vast opportunities created by modern biologic, natural and social sciences. This change in basic policy was born of no theorist's dream. It was forced on the homes by two interrelated factors: (1) the growing need for institutional care of sick or infirm old people resulting from the increase in the average span of life in general and the average age of the home populations and (2) the serious lack of good physical facilities for long-term medical care in the wide sense of the term.

The situation prevailing at the Jewish homes for the aged is not unique. Numerous homes for the aged under other auspices have gone through a similar process of adjustment of functions, although at a widely varying pace. Thus, the principal findings from the two studies may well be applicable to many hundreds of homes.

From the clinical point of view it is noteworthy that manifestations of impaired mental health were most frequently associated with clearly definable physical diseases. To what extent environmental factors played a contributory role was impossible to judge. This finding confirms the opinion of Roth

that "much that was formerly attributed to aging is in fact due to disease."[2] One can only hope that intensive clinical research, especially observations of groups of elderly people over long periods, will make it possible to clarify the etiology of mental impairment sufficiently to eliminate vague diagnoses, such as senility. If a uniform system of classifying mental disease in old age such as that suggested by the Expert Committee on Mental Health of the World Health Organization[3] could be introduced, the comparison of findings would be greatly facilitated.

Why so many residents of the homes behave as they do is not too hard to understand. As the findings from the case studies demonstrate, environmental factors, physical disease, or both in combination, cause abnormal reactions. Like all uprooted persons, elderly people entering a home feel lost in the new environment. They are easily annoyed by other residents and quick to complain, and they may become hostile if not depressed. Some harbor bitter feelings against relatives who have "abandoned" or "rejected" them; some are deeply distressed by the necessity of sharing a room with people of backgrounds different from their own; some cannot cope with the abrupt transition from loneliness to togetherness in the dormitory, dining hall and recreational facilities; some cannot accept the fact that once they were self-sufficient and capable of self-care but now they are poor and ill. Such reactions however, are not confined to new residents. They develop in the course of home life with worsening of the physical condition. As their infirmity increases, many residents become fearful, irritable, demanding or depressed, and some tend to spend much time in bed, with the result that growing physical weakness induces them to withdraw even more.

A constructive program of action must aim at three interdependent objectives: the emotional adjustment of all residents to home life, the constant supervision of those with minor disorders, and the intensive care of those with serious illness or impairment. To be prepared for this task the personnel of the home must understand the particular situation of the oldsters and must be equipped to take proper measures.

If all members of the staff are well informed on the mental health problem, understand its implications, realize the potentialities for effective service and are capable of warm outreaching compassion, they should be able to saturate the residents with attention, to encourage and reassure them whenever necessary, and to give the proverbial Tender Loving Care. Good medical, nursing and social service is basic, and diversional and recreational activities as well as occupational therapy can be of great value if they are utilized properly. It would be a mistake to insist on the "cooperation" of residents in planning these activities without a careful assessment of individual needs and capabilities.

The chief contribution of psychiatrists as Chodosh has said,[4] "consists of the integration of the therapeutic potential of the entire staff." To this end, all staff members—maids as well as professional and auxiliary health personnel —must be taught to avoid presumptuous judgments and to do their share in the "therapy of friendship," to borrow a phrase from William C. Menninger; and regular availability of psychiatrists for consultation and treatment must be assured. Since many residents are reluctant to present themselves to the psychiatrist, the home personnel, and especially the social workers, must make such referrals as appear necessary.

Constructive handling of the mental health problems of the oldsters living in homes requires the patience of St. Francis of Assisi, the prudence of Solomon, and the perseverance of Gandhi.

This becomes clear to everybody who visits a home for one hour only. Yet the surprising fact is that so much is actually accomplished in so many homes.

There are many and varied drawbacks to fast progress in the development of personal health services with mental health orientation. The tendency to slight persons with "irreversible" illness makes it difficult to overcome the idea of passively accepting the ailments of old age. What is of decisive importance is not the pathological process but the possibility of improving, or at least preserving, the functional capacity of residents, even if it can be achieved for a limited time only. It is easy to state that a homelike atmosphere should be provided. But the cold fact is that very little privacy can be offered by homes built many decades ago with the idea that multibed units are best. The widespread use of dormitories may easily prevent mental health. Of course, seriously incapacitated residents must be concentrated in special units to assure the best possible care, but the beds should be screened off for maximum privacy. The crucial problem is that of producing quality of health service in quantity. The very thought of it may frighten those who are familiar with the personnel shortages, especially in the fields of nursing and psychiatry, and the great difficulties of attracting competent personnel to homes for the aged. Instead of stressing solely the need for more and better prepared personnel, increased attention should be paid to the division of labor so as to reduce the need for highly skilled personnel and to the coordination of effort so as to achieve efficiency. That this is not wishful thinking is proved by the experience with distribution of responsibilities among professional nurses, licensed practical nurses and nurse's aides, as well as experience with cooperation between social workers and psychiatrists at the homes for the aged studied.

If the best prophet of the future is the past, as Byron once remarked, more and more homes for the aged are likely to become nursing homes in fact and thus to be confronted with the complex problem of effective organization of personal health services. The alternative, which is the operation of homes solely for persons "whose condition will not create difficulty or discomfort to others," including those with "mild mental disturbance," is a speculation on good luck as well as on ready help from other resources. No clause in the admission requirements can prevent a decline of the physical or mental health of residents during their many years of life in the home, and the transfer of all "unsuitable" residents to other institutions, with all its implications, becomes unavoidable. Obviously a strong case can be made for the transformation of homes for the aged into institutions for the long-term care of physically or mentally impaired adults and — as a corollary—for the housing of those requiring only limited help together with "well oldsters" in apartments close to those institutions. What is urgent now is a realistic policy for both the long-term institutional care of persons in ill health and the housing of senior citizens capable of self-care. But the word "realistic" should not be used as a convenient excuse for standing pat or for walking backwards into the future.

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An Integrated Approach to Multiple Needs

"The importance of an intimate interrelationship between medical specialties cannot be overstated. To maintain a balanced perspective toward an individual's medical care needs and to assure quality in medical services, it is essential that all medical disciplines be closely coordinated, with each specialty's clinical approach constantly available to, and reviewed and challenged by, the medical community.

"Communities have met the need for integrated services largely through their general hospitals. There, the various specialty services . . . operate in concert with each other. . . . Patients being treated in one service find their other clinical needs met from the other services. . . . Communications are augmented by regular clinical staff conferences. Professional review committees provide regular checks on the quality of care. The organization, in sum, works to maintain an integrated approach to the multiple medical needs of patients. . . .

"To a lesser extent, communities have sought to integrate services further by the development of non-institutional services such as nursing homes, home care programs, clinics, and preventive health programs. . . .

"Our recommendation for a single (State Department of Health and Hospitals) is directed toward an integrated system of medical care. It is designed to meet all clinical needs of a given patient and to prevent both social crippling and incomplete medical care, which are by-products of the fragmented approach to patient needs." ("Report of the Subcommittee on Organization for Health," Committee on Medical Care, Maryland State Planning Commission, June, 1960.)

At Atlantic City, N. J., the panel discussion on Administrative Decentralization of Environmental Sanitation Programs was keynoted by Dr. J. W. R. Norton of North Carolina. His informative address is presented below. A summation of the discussion was prepared by Dr. Getting and follows this paper.

ADMINISTRATIVE DECENTRALIZATION OF ENVIRONMENTAL HEALTH PROGRAMS

J. W. R. Norton, M.D., M.P.H., F.A.P.H.A.

RESPONSIBILITY for environmental health programs is found wherever people live, work, rest, or play. Concurrent support and authority should reside wherever the particular share of the work can be carried out most effectively and economically, whether in local county, municipality, or district, or in state, regional, or federal agencies. In each agency and in varying degrees we find research, trained personnel, fiscal support, policy determination, specialized consultation, administrative supervision, and practical implementation. Easy communication from broad local base to narrow federal peak of the pyramid, back again and throughout, is essential. Equally important is assurance that this staunch pyramid not become pot-bellied, top-heavy, or inverted in control, personnel, or fiscal support.

In the design of environmental health program, federal to local, there is increasing variability of responsibilities and needs, and there should be corresponding flexibility for adaptation to duties involved in promoting the protection and best uses of air, water, food, and shelter. As Mark Hollis has said so well: "Fundamentals have not been changed but factors are complex." Priorities differ from neighborhood to neighborhood and even change locally. As program needs move from local to federal, we proceed from the specific and variable to the general, and priority policy determinations return in reverse order. The general engineer and sanitarian may avail themselves of the services of several specialized consultants.

There is no fully accepted definition of "centralization" or "decentralization" and we find practical application of varying degrees by age of program or project and over-all organizational development centrally and locally. There is, however, unanimous objection, or should be, to centripetal diversion of all praise and delegation or decentralization of all blame. Whereas a high degree of centralization may be justifiable in certain special projects or in early stages, most central controls can usually be gradually decreased advantageously and certain locally developed projects can well remain freewheeling throughout.

After these general comments we can now discuss more exclusively the rela-

NOTE: The paper by James G. Terrill, Jr., M.S., "Ingestion of Radioactive Materials," which was also presented as part of this session was printed in the July, 1960, issue of this Journal, p. 989.

tionships which concern most of us move frequently in our program planning: local-state relationships. About the same could be said concerning the operation of a large city program with distances traveled as the main difference. Among types of environmental health programs we have states at the two extremes of centralization and decentralization and some in between. Differences are to some extent justified as adaptations to the many factors involved such as size of state, local health service development, available personnel, and special problems and needs. In North Carolina, for instance, we are definitely decentralized. Among determining factors with us are:

1. North Carolina with four and a half million people is over 500 miles long and each of the 100 counties has organized local services with personnel selected and paid by the local board of health.
2. Each of the 100 counties has sanitation personnel and encouragement is given to development of programs fitting peculiar local needs.
3. Problems and needs vary from those on a 300 mile coastline with shellfish, beaches and ports, a large agricultural area in the coastal plain, a more industrial-urban piedmont area, and a mountainous area with mines, resorts, summer camps.
4. Our county commissioners pay over three-fourths of the total costs of local health departments, and having shouldered that fiscal responsibility they are not willing to delegate chief authority to the state.
5. Our state district engineers and sanitarians operate from field offices to keep closer contact with local health and sanitation directors and to provide technical supervision over the publicizing and enforcement of state laws and regulations.

An item sometimes overlooked is that there may actually be time for and exercise of increased responsibility and authority for certain policy and administrative decisions by even a small state staff as decentralized local personnel become more competent in assuring effective practical operations. Even though we consider our North Carolina setup primarily one of decentralization of administrative activities in sanitation programs, we have recognized that both principles prevail to a certain degree. Details provide an example so that variations in each state can be brought into sharper focus.

In our Division of Sanitary Engineering we have three sections: (1) Insect and Rodent Control, (2) Engineering, and (3) Sanitation. In the Insect and Rodent Control Section we work primarily with the local health departments in the issuance of permits and inspection of impoundments as part of our program of malaria and other mosquito control activities. Larger impoundments such as hydroelectric reservoirs are inspected by entomologists or engineers directly from the State Board of Health. This is done because we believe that direct contact between the State Board of Health and officials of the power companies and corps of engineers could best be handled by the engineers of the state office and would also lessen the confusion which might otherwise exist. Our routine mosquito control work and rodent control work, however, is carried on through the local health departments with our consulting staff providing technical scientific assistance. In this section also is our Bedding Inspection activities, and since this is an activity financed entirely by the bedding industry, the sanitarians on this work do not ordinarily work through the local health departments unless requested to answer complaints or handle some special problem which may have been called to the attention of the local health director.

Our Sanitation Section is concerned primarily with activities relating to the enforcement of state laws, all of which are handled through local health departments. Our district sanitarians provide technical supervision, assist with the interpretation of laws, the handling of special cases, evaluation studies of local services, assistance in the review of

plans for nursing homes, public eating places, etc., work with local health departments on dairy and pasteurization plant inspections, make surveys for the USPHS, and keep in close contact with the local departments in their respective areas. At the present time, we have eight such sanitation districts. There are some activities carried on directly by the State Board of Health in the field of sanitation, such as the review of plans for hospital construction or renovation; review of plans with the Department of Public Instruction for school house construction; cooperate with the Department of Conservation and Development in the Shellfish Sanitation Program; and check all prison camps and county and city jails. The inspection of state institutions is made jointly by a representative of this office and the local health department. We feel that having one person in the central office dealing directly with the other state agency involved in state institutions and hospitals makes for a smoother administrative line of responsibility.

In our Engineering Section, the engineers are primarily concerned with the protection of public water supplies and assisting municipalities with their operational problems of water and sewage treatment plants. This activity is carried on directly with the municipalities. The local health departments are informed and their assistance is requested in connection with certain phases of the water supply and sewage disposal work. Since a great number of our local health departments do not have engineers on their staffs, our district engineers are available to assist them with sanitary engineering problems. These have to do with location of wells, sewage treatment facilities for eating and housing places outside of municipalities, promotion of sanitary districts, special water supply and sewage problems, swimming pools, bathing areas, and similar types of problems where local engineering services are not available for such consultations.

It is likely that there are other states, such as ours, where the consideration of centralization of certain type activities and decentralization of other type activities would make for the better execution of the over-all sanitation program. It would appear that each state would need to adjust its administrative pattern in such a way as to serve the people of the state more adequately, efficiently, and economically.

In appraising benefits for centralization or decentralization there will be found adjustments due to varying needs, problems, organization patterns, available personnel, from the likes and dislikes or prejudices one develops from unfamiliarity with the other side, and even from the fact that it is not easy to decentralize environmental sanitation programs in states that have their entire health staffs concentrated in the state capital and their large cities. Among the pros and cons advanced are the following:

1. Centralization:
   a. It avoids lack of uniformity, or conflicting policies and interpretations which might lead large companies with branches and traveling agencies to become confused and resistant.
   b. State support for uniformity results in fewer successful pressures toward favoritism by special interests which might take advantage of the local unorganized public.
   c. Centralization encourages better coordination and closer cooperation with other state agencies having a joint responsibility—such as Departments of Agriculture, Schools, Welfare, or Hospitals.
   d. A smoother system of promotion, retirement, and training can be evolved under centralized control.
   e. Effective state-wide programs with their laws and regulations may be more uniformly interpreted, administered, and enforced since many are of state-wide significance.
   f. Decentralization requires a greater number of costly well trained personnel since authority is more scattered and disjointed.

g. More highly trained central office personnel are needed to work smoothly with a decentralized program.
h. Decentralization frequently requires generalization on the part of professional personnel with specialized consultation from the central office.

2. Decentralization:
a. Requires less unproductive effort, time, and expense, such as travel, resulting in a greater volume and better quality of work at less cost.
b. Methods employed are adapted to local conditions and involve less resentment from "outside interference."
c. Workers become better acquainted in the community and some travel time saved can be invested in health education and to meet newly developed needs.
d. Local pride of ownership stimulates more support than if leadership and ownership are more removed.
e. Some decentralization is unavoidable, since there probably will never be enough state personnel to enforce all state laws and regulations without local assistance.
f. Professional growth and maximum achievement are encouraged among subordinates when delegation is followed by noninterference so long as assigned duties are executed properly.
g. New local stresses or strains created by new industries, tourists, migrant laborers, or fringe areas with their shifting of priorities may be adjusted to more promptly with decentralization.
h. Certain problems such as milk production and processing, insect and rodent control, rural water supplies, and excreta disposal can be handled best under decentralization.

In either centralization or decentralization there must be certain checks and balances: plans, policies, guide lines, as well as the laws and regulations intended to assure uniformity and fairness and also quantity and quality of service. We know also that either plan will fail without certain basic elements which we have attempted to provide in North Carolina such as:

1. Employment of competent personnel.
2. Employee appreciation of the importance of formal and inservice training.
3. Provision of specialized consultation to meet unexpected emergencies and crises.
4. A planning and evaluation system to insure attention to priorities and an acceptable standard of performance.
5. Revision of laws and regulations to prevent health hazards rather than to delay and to be faced with more costly salvage and corrective operations.
6. Recognition that appropriating bodies, governing boards, and health directors are factors in the success or failure of any administrative pattern used.

I have deliberately avoided discussing details of retaining or delegating authority and responsibility for environmental health programs because each state, district, county, or municipality varies in its relationships with other echelons. In some states there may still remain legal barriers to decentralization and only recently has permissive legislation been passed in a few states for the development of local health departments to serve their rural areas. We recognize that differences in states justify differences in administrative pattern such as we find in Delaware and Texas, Nebraska and Mississippi, or Connecticut and Alaska. Similar differences within a state justify patterns of administrative centralization or decentralization that encourage adaptation and flexibility to achieve effectiveness and economy. Changing ecology and new knowledge in such areas as air and water, housing, radiobiology, and oceanography will bring challenges in the near future as our horizons of ignorance shift between horizontal and vertical.

Dr. Norton is secretary-treasurer and state health director, North Carolina State Board of Health, Raleigh, N. C.

This paper was presented before a Joint Session of the Conference of Municipal Public Health Engineers and the Engineering and Sanitation and Health Officers Sections of the American Public Health Association at the Eighty-Seventh Annual Meeting in Atlantic City, N. J., October 20, 1959.

At the conclusion of the discussion in administrative decentralization of environmental health programs, Dr. Vlado Getting of Michigan summarized the major points. This excellent summation is presented here as a compact but highly informative statement of current views on this administrative question.

ADMINISTRATIVE DECENTRALIZATION OF ENVIRONMENTAL HEALTH PROGRAMS: SUMMARY OF A PANEL DISCUSSION

Vlado A. Getting, M.D., Dr.P.H., F.A.P.H.A.

THE ADMINISTRATIVE organization of environmental health programs should be such as would enable the personnel to respond rapidly and efficiently to the needs of the people. It has been amply demonstrated by the several speakers that no single pattern of organization will meet the needs of the variable conditions which exist in the different areas of the country. Each speaker has utilized his experiences in presenting his material on the subject of decentralization, as compared to centralization, of administration. At the beginning it might be well to distinguish between two different types of decentralization.

First, there is the decentralization which occurs within the structure and programing of a state health department. Many states, including Massachusetts, New York and Ohio, have decentralized their consultant staff into regional or district offices. Each such district or branch office serves a portion of the state; the entire state being divided into such districts. Consultation to local health departments, and sometimes services to those portions of the district not organized for the provision of local health services, are rendered from a district office. Such decentralized branches are usually headed by a public health physician entitled district or regional health officer. On his staff are the necessary personnel in the fields of environmental health and public health nursing, as well as other public health specialists.

In a similar manner a large, local health department may decentralize its administration to district or branch offices. Examples here are Boston, Detroit, New York City, Cleveland, Cincinnati and St. Louis County, among others. Such decentralization of a local health department, while complete as to geographic coverage, is usually partial and rarely complete as to program coverage. Thus, a district or branch office of a local health department may be under the direction of a district health officer, or it may be without a local health officer. Decentralization may apply only to public health nursing. It may apply only to environmental health, or to both, without decentralization of other types of services. In this session we are concerned with a development of the decentralization of environmental health services in a local health department to branch offices and are discussing the administrative as well as the technical control of such decentralization.

The second type of decentralization which has been discussed is the delegation of responsibility and authority in whole or in part for a program from the state health department outward to the county or city health departments. Here the concept of decentralization means the transfer of program activities from one level of government to another. It has been made quite clear by the speakers that such decentralization is usually partial in that not all environmental health services are decentralized to local health departments.

North Carolina: State to Local Health Departments

In his presentation, Dr. Norton described the situation in North Carolina. In this state, decentralization is made to fit the needs of North Carolina. Each state, said Dr. Norton, must adjust its pattern to fit the needs of its people. He cited the advantages of state centralization as being (1) Uniformity, (2) Greater ability to handle specialized pressures, (3) Coordination with other state agencies, (4) Uniform personnel policies, (5) Uniform regulations and enforcement, (6) Smaller number of specialized personnel, (7) Better trained specialists, (8) Less generalization but more expertness available. The advantages of decentralization, he continued, are that (1) less time and travel are required—therefore, greater economy is achieved; (2) there is no outside interferences; (3) knowledge of the local community is better; (4) there is local pride of ownership; (5) local enforcement is essential; (6) professional growth and achievement are encouraged; (7) personnel are better able to respond to local needs; (8) environmental health problems are better handled locally. As is apparent, Dr. Norton, in discussing centralization versus decentralization, is speaking about the delegation of programing from the state to the local health department and summarizes his statement by pointing out that adaptation and flexibility are necessary for true effectiveness, that the question of decentralization versus centralization is not the same for all aspects of environmental health programs. Certain of the programs can and should be decentralized, whereas authority for others and the responsibility for their conduct should remain with the state.

Georgia: State to Local Health Department

Mr. Boston, in his presentation, put forth the conviction that the local health departments are the basic service units to render direct service to the people. His experience is in the State of Georgia, where all of the state is divided into local health units consisting of county or multiple-county districts, with consultation available from regional medical directors. In his opinion, the need for and degree of administrative decentralization of environmental sanitation programs will vary according to each individual program, depending upon such factors as type and scope of the program, personnel requirements, uniform application of standards, budget limitations, etc. Decentralization, he states, should result in (1) greater economy, (2) reduced time and expense of personnel travel, (3) the personnel being closer to the people receiving the services, (4) better understanding of local conditions, (5) better public relations, and (6) better cooperation from the public in general. Centralization of direct services, however, he states, seems to be indicated where experienced, specialized scientific or technical personnel are required and where such services are not needed or are available within full-time local health units. He points out that especially in those program areas where two

or more local health jurisdictions are affected is central administration indicated.

St. Louis County: County Headquarters to District Offices

Mr. Mitchell is concerned with the decentralization of environmental health services within St. Louis County. Here decentralization means the setting up of district offices to serve assigned geographical areas. According to the experience of the St. Louis County Health Department, records indicate considerable saving in travel time and increase in work accomplishment as a result of decentralization, sufficient to defray the cost of rental of office space. In addition, the department's records indicate a marked increase in the volume of work completed by the sanitarians as a result of the time saved in travel. Moreover, he points out, such decentralization was not only economical but proved to be convenient to the portion of the population being served from each of the district offices. He notes that decentralization through the district organization of a local health department was quite different from the decentralization of district organization of a state health department. In a local health department, because of the necessity of giving uniform direct services to people, a uniform policy and uniform procedures are essential. Here is presented for the first time a discussion of the difficulties of technical versus administrative supervision.

All good public administrators agree that an employee should have but one boss, one supervisor. In setting up a district organization, however, we find that technical personnel are now assigned to work under the supervision of the local district director. The director of the local district is usually a full-time public health physician and he is made responsible for the administrative control of all the personnel assigned to such a district. These may be sanitarians, public health nurses, dental hygienists, physical therapists, health educators, clerks and others. He is held accountable for conducting staff meetings for the district staff; for supervising their work, their daily schedule; for approving travel vouchers, vacation schedules, sick leaves and other personnel matters; and for planning and directing the public health program for his district. Personnel assigned to such a district, however, often remain under the technical supervision of their superiors in the central office. Thus, the sanitarian remains responsible for the technical content of his program to the chief sanitarian or the chief sanitary engineer in the office of environmental health of the central staff. Similarly, the public health nurse, while administratively responsible to the head of the district office, is technically responsible to the chief public health nurse in the central office. This dual responsibility, administrative on the one hand and technical on the other, is often times confusing to the individuals concerned. A decision often needs to be made as to what is technical and what is administrative. Health departments have found it advisable to develop manuals of procedure which specifically indicate the nature of each of these decisions as it pertains to specific items. Thus, the question as to whether a matter is technical or administrative in nature can often be quickly resolved in a uniform manner by reference to the manual.

Philadelphia: City to District Offices

Mr. Purdom discussed the decentralization of the Philadelphia Health Department, which was started in 1958. Though originally opposed to decentralization for environmental health services, he now advocates such decentralization. The central staff is now enabled to spend more time on planning, as routine

services and the responsibility for their attainment are delegated to the decentralized districts. Mr. Purdom has concluded that operations are best carried out when they are close to the people. He described how the environmental health services were gradually decentralized. It is not possible, he states, to decentralize everything simultaneously. In Philadelphia one program after another was gradually decentralized. Some remain the responsibility of the central office and will remain such because of the technical nature of their content. It becomes apparent that decentralization is most effective when the district director has both the time and the interest to give adequate supervision to each of the programs for which his staff is responsible.

Illinois: State to District Office to Local Health Department

Dr. Sutton presented the decentralization program of the State of Illinois. He conceived of decentralization as the movement of a program from the state health department to local health units. Decentralization, he stated, depends on the personalities of the people concerned. On the one hand, the local agency must be willing to accept decentralization. It must have able personnel, adequate in number, to assume the new responsibility. The state must be willing, on the other hand, to delegate authority with decentralized responsibility and to back up local health units when decisions are made by them. The state, he said, should fill gaps, set standards, stimulate local health departments and give supervision in a decentralized program. Decentralization, he continued, may be resisted by both state people and local people as well. This is due to the fact that most people will resist change, and secondly, because decentralization may not be uniform owing to the great variation in local health facilities. He compared the coverage of the State of Illinois to a piece of Swiss cheese with holes or lacunae where local health services might be lacking, as compared to other areas where substantive programs might be in operation. The delegation of environmental health programs to local health departments may be complicated by the fact that enforcement may sometimes hurt local citizens. Nevertheless, such delegation can be carried out if the state health department will support the local health department in the application of its decisions. When such decentralization takes place, it may be necessary to assume the training of personnel for this new responsibility. Consultation services may also have to be given to the local health department and, from time to time, supervision of the conduct of the assigned decentralized responsibility may have to be developed. There are, however, in his opinion, certain programs where centralized administration of their activities will perhaps continue for a long time to come. Among such environmental health programs are the control of stream pollution, a program of air pollution control, and the supervision of radiological health. It could be visualized that very large local units with facilities to employ experts, to some degree on a regional basis, may assume some responsibilities for such programs as radiological health and air pollution control under the over-all supervision and with directives from the state health department.

Discussion from the Floor

Mr. Thompson of New York pointed out that the best way of doing the job is the deciding factor in whether to decentralize or centralize. What is to be done, where it is to be done, when and why and who is to do it are questions which must be considered. How is it to be done? Decentralization is not merely the assignment to someone else of those jobs which one does not

want to do. Delegation of responsibility means giving authority to the person to whom the responsibility is decentralized. This person must accept the delegation and must be prepared to carry it out. In New York State a program such as the approval of sewage treatment plants cannot be decentralized. With decentralization there must be the setting of guide lines and standards by the state. Often an environmental health program should have a multiple approach. Some things may remain the responsibility of the federal government, of the state government, or of the local government. This is true in the control of pollution of streams and water, where the federal government becomes concerned with interstate matters, the state becomes concerned with the proper supervision of the public sewage disposal plants and those of large industries, and local health departments are concerned with the proper control of private sewage disposal units.

Dr. Hanlon of Philadelphia spoke about the possibility of an admixture of both centralization and decentralization. The time to decentralize depends upon conditions being suitable when decentralization is proposed. Thus, it becomes obvious that to decentralize a program from the central office of a local health department to branch offices, when no space exists for housing additional personnel, is untimely and will not succeed. Or another illustration—it would be foolhardly to attempt to decentralize a program of licensing of hospitals to local health departments when local health departments do not employ the competent or experienced personnel necessary to carry out the program uniformly. On the other hand, decentralization of the licensing of nursing homes may be an entirely different matter. Here, without the coverage of local health departments of an entire state, one can easily visualize the delegation of a part of this responsibility to local health departments, whereas the state would continue to carry the program for those areas which are without local health departments. In such a program the state has to make sure that adequate provision is made to train local people, must set up standards and guides so that local people may uniformly interpret the rules and regulations and, finally, the local people have to be confident that their decisions will be backed up by the state.

Mr. Senn of Los Angeles discussed the problem of program decentralization versus administrative decentralization, as have some of the other speakers. It is indicated that program decentralization may occur even from a central office without administrative decentralization into districts. Mr. Senn is not convinced that a district health officer has the time or interest to support environmental health programs, which need enough expertness at the local level to be successful.

Dr. Vaughan of the University of Michigan School of Public Health made the point that decentralization may bring about proved results because usually the greater the local autonomy and participation, the better the work. Such decentralization, whether from a state to local health department, or within a local health department, usually means increased economy and efficiency. "Circumstances permitting" was a phrase which he applied as to the advisability of decentralizing. We cannot have hardening of attitudes, he continued; we must be reasonably conservative but at the same time progressive and open minded enough to accept an experiment in new administrative procedures.

Summary

It is not a question of centralization versus decentralization or whether you favor or oppose one over the other.

Some of the factors which should be considered in arriving at a decision to decentralize are timeliness, effectiveness, "circumstances permitting," readiness of personnel to accept change, responsiveness to new needs, the nature of the program under discussion, the individuals and agencies involved. State health departments may decentralize their services to branch offices, commonly known as district or regional health offices. In a similar manner, cities and large counties may decentralize their services to branch offices. Both such decentralizations are made in an effort to be closer to the people served, to conserve money and time, and thus to be more effective as well as more economical. Because staff members working from a branch office know their area and their people better, they, in turn, are more likely to be accepted and to do a more effective job in a limited area.

Another type of decentralization means the delegation of program activities from the state to local health departments. Along with such delegation of responsibility must go a delegation of authority and an assumption of certain responsibility to back up the local units in a time of crisis. Here the training of personnel, the setting up of guide lines and standards and occasional supervision may be required to insure uniformity of enforcement. There must be a willingness on the part of the state to decentralize and a willingness on the part of the local health department personnel to accept such new programs. In public health, one must always be prepared to carry on administrative and operational research so as to improve methods of delivering better community health services. Because of their technical nature, some programs may always remain the responsibility of state personnel. Other programs, as local health department personnel become more experienced and adequate in number, may certainly be delegated to local health departments.

It must be borne in mind that, when new programs are assumed by any agency, advance planning must provide for adequate additional facilities to handle the new responsibility. So often it happens that additional duties are thrust upon personnel without their also being given guidance as to which of the old programs they may now discontinue or de-emphasize. The responsibility for this type of adaptation to change must be exercised by the director of environmental health services and not left to the decision of field personnel, who under these conditions are likely either to cut corners and try to do everything or to eliminate those things which they personally like the least. The judgment as to what programs to de-emphasize or to eliminate should be made by the director of the environmental health program and uniformly applied in the same manner, whether in a centralized unit or a decentralized unit.

In the final analysis, centralization and decentralization of environmental health services may proceed hand in hand. Some programs may be centralized, others decentralized, depending upon the willingness and availability of personnel, the nature of the program, and a mutual respect for the role of each person concerned.

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This paper represents substantially the summarization presented by Dr. Getting at the close of a panel discussion before the Conference of Municipal Public Health Engineers and the Engineering and Sanitation and Health Officers Sections of the American Public Health Association at the Eighty-Seventh Annual Meeting in Atlantic City, N. J., October 20, 1959.

To study the prevalence and characteristics of accidental poisoning in an urban population, families in Syracuse, New York, were interviewed. The characteristics of the sample population are examined in this report. The findings of the study will appear in the December issue.

THE EPIDEMIOLOGY OF ACCIDENTAL POISONING IN AN URBAN POPULATION: I. SELECTION OF THE POPULATION SAMPLE AND INTERVIEWING TECHNICS

C. V. Willie, Ph.D.; Virginia Goddard Harris, M.D.; and P. F. Wehrle, M.D.

ALTHOUGH considerable information concerning accidental poisoning has become available with regard to both hospital experience[1,2] and mortality,[3] these data have limitations in appraising the actual extent of the problem. It is apparent that geographical differences exist and also that data collected from hospitals, information centers[4] and mortality records refer to different facets of the problem. Direct sampling of populations by interview technics may be expected to yield a more accurate appraisal of this situation. To date this approach has had relatively little application.[5]

The present study has been developed to determine the prevalence and characteristics of accidental poisoning in an urban population. These data, collected by direct interview, are compared with those available from hospital reporting and from the local poison information center, for the same area during the same time interval, in order to contrast the types of information obtained from these three sources.

Methods

Data concerning episodes of accidental poisoning were obtained by direct interviews with a representative 2 per cent sample of the total population of Syracuse, New York. Syracuse is an industrial city with a population of 214,252, according to a 1957 census. It represents the central city of a large metropolitan area in Upstate New York and is the fourth largest city in the State. The major industries are diversified and more than 500 industrial plants are located in the area. Two universities and the State University of New York Upstate Medical Center are also located in this city.

A poison prevention program, including a poison information service to physicians, was established in Syracuse in March of 1957. This is sponsored

Table 1—Occupational, Housing and Educational Characteristics of the Population, by Socioeconomic Areas, Syracuse, N. Y., 1950

Socio-economic Area	Per cent of Operators, Service Workers, Laborers	Average Contracted Monthly Rental	Average Value of Owned Home	Per cent of Single-Family Dwellings	Median School Year Completed*	Average Socio-economic Status Score†	Number of Census Tracts
I	8.82	$79.89	$19,278	73.26	12.7	120.71	3
II	14.23	54.28	14,125	61.79	13.1	122.22	6
III	23.47	51.43	10,506	62.00	11.8	106.30	10
IV	28.55	46.78	9,801	32.55	11.3	101.94	11
V	39.12	41.24	8,353	27.80	10.1	96.46	12
VI	51.47	33.68	6,820	16.62	8.7	89.92	17

* Technically, the "median" school year of a socioeconomic area is an average of the medians in each census tract of that area. Educational data were tabulated by census tracts only for persons 25 years of age and over.

† The socioeconomic status score was a composite of the five variables representing occupational, housing and educational characteristics of the population. The distribution of each variable by census tracts was transformed into standard scores and the five distributions of standard scores were arithmetically averaged in a composite socioeconomic status index. The distribution of operatives, service workers, and laborers was inverted so that it could be combined with the other four variables. Each census tract had a composite score.

by the City Health Department, with active participation by the State Department of Health, the Onondaga County Medical Society, the Academy of Pediatrics and The State University of New York College of Medicine. Data regarding Poison Information Center activities and hospital experience with both inpatient and outpatient treatment for poisons was collected through these facilities.

The population selected for direct interview consisted of 1,069 families with 4,069 individual members. This represented a 2 per cent sample of the entire city. The sample was selected by random technics within each of six areas previously established by one of the authors (C.V.W.). These areas were defined on the basis of socioeconomic status.

A socioeconomic area consisted of several census tracts having populations relatively similar in occupation, in education, and in the characteristics of their environment. A detailed description of the methods used and a definition of the areas covered is available.[6,7]

The six socioeconomic areas were delineated on the basis of 1950 census data and their characteristics are summarized in Table 1. Area I, the highest, was characterized by a majority of professional, technical and managerial workers, high school and college graduates, and recently built, owner-occupied dwellings of high value. Area VI, the lowest, was composed chiefly of laborers, service and semiskilled workers with limited scholastic background who were living in old multiple-family dwellings. The relatively few owner-occupied homes had an average valuation of about $7,000. The other areas ranged between these two extremes in an orderly progression, as noted in Table 1.

From the 59 tracts in the city, 18 census tracts representative of the six socioeconomic areas were selected. Actual selection of the persons interviewed was on the basis of households. Beginning at an intersection near the geographical center of the tract, every third household was approached by one of three interviewers using a previously standardized technic. All dwellings were included, with the exception of the relatively few large multiple-apartment

buildings. Interviews continued in this tract until a previously specified number of interviews had been completed.

Interviews were conducted during July and August of 1958 by three senior medical students (P.D., J.F. and J.W.). The interview period was preceded by a three-week planning and training period before entering the field project. All information regarding a family was obtained from a single responsible person, usually the housewife. After a brief explanation of the purpose of the study, data concerning the characteristics of the family group were collected directly on Keysort(R) cards and a history of accidental poisoning was obtained for three time periods. These were the previous month, the previous year, and the duration of existence as a family unit.

In this study accidental poisoning was defined as the definite ingestion of any substance potentially harmful in the quantity ingested, whether or not symptoms actually resulted or specific treatment was obtained. In order to aid in recall a uniform check list was utilized for the various categories considered. The files of the poison information center were utilized in evaluating agents of unknown composition or doubtful toxicity. It should be emphasized that items such as book matches, tastes of the contents of ash trays and similar episodes were not recorded in these interviews. Additional data regarding the source and circumstances surrounding the accidental poisoning episode were also recorded.

Characteristics of the Survey Population

As can be seen in Table 2, the percentage distribution of the sample population was similar to that of the total city. The sample population ranged from 4.3 per cent in the highest socioeconomic area to 26.1 per cent in the lowest area, as compared with the total population, which ranged from three and a half in the highest to 27.3 per cent in the lowest socioeconomic area. The minor differences in the percentage distributions of these two populations were not statistically significant.

The age and sex distributions of the sample and total city populations are presented in Table 3. By age, the sample population had a distribution pattern which approximated that of the total city, although a slightly higher proportion of children under age nine

Table 2—Distribution of Total Population (1950)* and Sample Population, by Socioeconomic Areas, Syracuse, N. Y., 1958

Socioeconomic Area	Total Population		Sample Population	
	Number	Per cent	Number	Per cent
I	7,758	3.5	174	4.3
II	25,305	11.5	492	12.0
III	31,873	14.5	573	14.0
IV	46,179	21.0	882	21.5
V	48,834	22.2	907	22.1
VI	59,951	27.3	1,068	26.1
Total	219,900	100.0	4,096	100.0

* Source: See References 6 and 7.

Table 3—Age and Sex Distribution of Total City Population (1950)* and Sample Population, Syracuse, N. Y., 1958

Age (in Years)	City Population				Sample Population			
			Total				Total	
	Male	Female	Number	Per cent	Male	Female	Number	Per cent
Under 1	2,079	2,100	4,179	1.89	63	55	118	2.88
1- 2	4,395	4,098	8,493	3.85	95	98	193	4.71
3- 4	3,676	3,520	7,196	3.26	101	96	197	4.81
5- 9	7,540	7,142	14,682	6.66	235	252	487	11.89
10-19	13,173	13,919	27,092	12.28	300	348	648	15.82
20-39	35,912	36,875	72,787	33.00	509	564	1,073	26.20
40-64	31,643	33,630	65,273	29.59	463	509	972	23.73
65 and over	9,137	11,744	20,881	9.47	174	234	408	9.96
Total	107,555	113,028	220,583	100.00	1,940	2,156	4,096	100.00

* Source: See References 6 and 7.

and a slightly lower proportion of adults 20 to 65 years of age were present in the sample population. Thus, the sample population had a median age of 28 years as compared with a median age of 33 years for the total population. Also there were 90 males to every 100 females in the sample population as compared with the total population in which there were 95 males to every 100 females.

The household composition of the sample population also differed somewhat from that of the total city population, according to Table 4. The sample population had a slightly higher proportion of households with four or more persons which resulted in a median figure of 3.6 persons per household, as compared with the total city population of 3.0 persons per household.

These differences in median age, sex ratio and median size of household indicate that the sample population was not identical to the total city population. It should be reiterated that since the sample population obtained in 1958 is being compared with the total city population as it existed in 1950 some change in composition and distribution may be expected. Therefore, the sample population was considered to be reasonably representative of the total city population in age, sex, and in socioeconomic status.

Summary

An attempt has been made to study the prevalence and characteristics of accidental poisoning in an urban population. The method of approach is that of direct interviews with members of the families of 2 per cent of the population of Syracuse, New York.

The age, sex, socioeconomic area of residence and family size of the study population have been examined. While the sample population is not identical in all features with that of the total city, it seems to be reasonably representative. The variations observed seem likely to be due to the time (eight years) between collection of the census data and selection of the study population rather than to any other factor.

Table 4—Number of Persons Per Household in Total City Population (1950)* and Sample Population, Syracuse, N. Y., 1958

Number of Persons per Household	City Households		Sample Households	
	Number	Per cent	Number	Per cent
1	6,131	9.70	58	5.43
2	18,481	29.24	253	23.67
3	15,148	23.97	196	18.33
4	11,607	18.36	240	22.45
5	6,278	9.93	152	14.22
6	3,031	4.80	99	9.26
7+	2,528	4.00	71	6.64
Total	63,204	100.00	1,069	100.00

* Source: See References 6 and 7.

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The Healthy Citizen

I suppose the makers of sputniks and atom bombs consider their work of major importance but I think any fair-minded person will agree that health is the core and center of our civilization. . . . A dead man is not a useful citizen; but a citizen who is healthy—physically, mentally, and emotionally—can be a useful citizen and is one who may mend many of the unhappy conditions of this upset world.

(Mrs. C. E. A. Winslow, in a speech presented at the May 1958 meeting of the Board Members Organization, Visiting Nurses Association of Connecticut.)

This study examines the comparative hospitalization experience of members of the International Ladies Garment Workers Union under two different medical care plans. The medical care to which they were entitled was essentially the same, but the organizational and financial forms through which care was provided differed. The observed differences are discussed and possible explanations are advanced.

PREPAID MEDICAL CARE AND HOSPITAL UTILIZATION IN A DUAL CHOICE SITUATION

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THE DEVELOPMENT of social mechanisms to protect the individual and his family against the economic vicissitudes of ill health has made enormous strides in the decade now drawing to a close. In addition to evolving insurance programs, various forms of organization of medical practice have developed to provide the service covered by the insurance schemes. But as hospital costs have continued to mount and premium rates have been increased to meet these costs, it has become clearer that the relationship between the insurance mechanism and utilization must be more fully understood, if the mounting spiral of costs and premium rates is to be brought under control. Fortunately, the very variety of programs that has evolved in itself provides an opportunity to study the effect of various forms of organization of medical care and of types of coverage on hospital utilization. The present report, the second of a series, examines the utilization of hospitals in two different medical care programs.

In the previous report of this series,[1] the utilization of hospitals was studied for two population groups (Blue Cross-HIP and Blue Cross-Blue Shield) which differed in the extent of their medical insurance coverage, in terms of the organization of medical practice under which they received service, and the method of paying the doctors for providing service. That study showed significantly lower hospital admission rates for the population with comprehensive group practice medical care coverage than for the population with primarily in-hospital fee-for-service solo practice medical coverage. This paper sets forth the comparative hospitalization experience of members of the Dress Joint Board of the International Ladies Garment Workers Union under two different medical care plans for which they are eligible under a dual choice arrangement. The two plans are Group Health Insurance (GHI) and the Health Insurance Plan of Greater New York (HIP).

This report differs from the previous

study in that the members of the two study populations are all employed in the same industry and the medical care coverage to which they are entitled is essentially the same under the two plans. However, as in the previous study, one of the study populations—that enrolled in GHI—has its medical care provided, in the main, through fee-for-service solo practice. The other, enrolled in HIP, receives its medical care through medical groups, which receive payment on a capitation basis.

The Study Populations—On November 1, 1955, the Joint Board of the Dress and Waistmakers' Union of the ILGWU negotiated contracts for the provision of hospitalization and medical, surgical, and specialist care for members of Locals 10, 22, and 89. All workers within the membership jurisdictions of these locals, who had been and were employed by firms required to contribute to the Health and Welfare Fund of the industry, were eligible for benefits, provided they had at least six months employment in the dress industry. Hospitalization was provided through Blue Cross. Medical, surgical, and specialist care were to be provided through either HIP or GHI. The individual worker was given a brochure setting forth the specific benefits available in each plan, the limitations and exclusions, and how the services are provided. Each worker then chose one of the plans.

The two basic population groups for this study were defined as those members of Locals 10, 22, and 89 of the ILGWU who were subscribers continuously to either (1) HIP or (2) GHI during the period July 1, 1956, through June 30, 1957. Thus defined there were 25,011 subscribers to GHI and 17,716 subscribers to HIP whose hospital utilization under the two plans could be studied.

About 93 per cent of the enrollment in the two medical care plans is accounted for by Locals 22 and 89 whose members are almost entirely women. Local 10 which accounts for the other 7 per cent of the enrollment has largely a male membership. Nearly two-thirds of the members of Local 22 in the study were enrolled in HIP but, on the other hand, nearly 80 per cent of the members of Local 89 were enrolled in GHI. (See Appendix Table A for age, sex, and union local composition of the two study populations.) These two locals also differed in their ethnic composition, Local 22 being largely Jewish and Local 89 Italian. All rates for the two study populations as a whole are adjusted to take account of the differing proportion of the membership of the locals in HIP and GHI.

Information about the hospital admissions of the two study groups was obtained from the Associated Hospital Service of New York (Blue Cross) which maintained a separate file for all claims for hospitalization of members of the three union locals. It was only necessary to identify the medical insurance plan to which the hospitalized individuals belonged. All paid claims for hospitalization of one day or longer are included regardless of type of accomodation used and whether or not the physician participated in HIP or GHI. Thus any claims made by HIP patients hospitalized by non-HIP doctors are included.*

Medical Care Programs — Benefits available to the Dress Joint Board subscribers under the GHI plan were family doctor and specialist consultant services in the home, office, or hospital; surgical service in the hospital, home, or office; laboratory tests and procedures; x-ray procedures for diagnosis and treatment; preventive medical service in the doctor's office but not including immuniza-

* The reader interested in the detailed methodology for obtaining the study populations and matching them with hospital claims and transfer status may obtain a discussion of this by writing to the authors.

Table 1—Annual Hospital Admission Rates, July 1, 1956-June 30, 1957, HIP and GHI—Insured Groups

Unadjusted Rates and Rates Adjusted for Age, Sex, and Union Local*

	Rate Per 1,000 Population	
	HIP	GHI
Both Sexes		
Unadjusted†	65.2	74.6
Adjusted for age, sex, and local†	70.2	88.3
Males		
Unadjusted	75.5	67.9
Adjusted for age and local	76.5	83.0
Females		
Unadjusted†	62.3	76.1
Adjusted for age and local†	68.6	89.7

* Adjusted to the age-local or the age-sex-local composition of the combined population of the two groups, HIP and GHI, except that data for females exclude Local 10.

† Chances are less than one out of 20 that as large a difference between rates for HIP and GHI, as observed, is due to random factors.

tions; treatment of allergy; and visiting nurse service. Maternity care was not provided under the Dress Joint Board contract, neither was the administration of blood and plasma, nor private ambulance service.

The medical care under GHI is provided, in the main, on a solo practice basis. The subscriber may seek care from any physician, but a majority of the family physicians in New York City are listed as participating physicians in GHI. These physicians have agreed to accept the GHI schedule of fees for their services. Other physicians may charge more than the schedule in which case the difference is met by the patient.

Services available through HIP are: family doctor and specialist consultant visits in the home, doctor's office, group medical center, and hospital; surgical service; maternity care; laboratory tests and procedures; x-ray for diagnosis and treatment; preventive medical service, including immunizations; treatment of allergy; administration of blood and plasma; ambulance service; and visiting nurse service.

HIP operates as a prepaid medical service plan, providing medical services through the group practice of medicine. The individual physicians may have private practices in addition to their HIP practice. The groups are paid on a member capitation basis, whether services are required or not, and the doctors are then paid by the groups. Patients receive no bills, and there is no exchange of money for services between patient and doctor.* The number of services that may be obtained by patients is unlimited.

In both plans only the union members and not their dependents were covered for medical services or hospital care; and the Blue Cross contracts excluded hospitalization for maternity care.

Findings

Annual Admission Rates — In the period studied the annual hospital admission rate was 65.2 per 1,000 popula-

* The only exception to this is a possible $2.00 charge for a night call to the home between 10:00 P. M. and 7:00 A. M.

tion covered by HIP as compared with 74.6 per 1,000 for the population covered by GHI (Table 1). Adjustment to take account of differences in the age, sex, and union local composition of the two populations increases the size of the difference. The unadjusted HIP rate is 12.6 per cent less than the GHI rate, but the adjusted rate is 20.5 per cent lower.

Adjusted rates throughout this paper were derived in order to compensate for differences in the composition of the populations studied. These adjusted rates are the hypothetical rates which would have been obtained had the two study populations had the same composition.*

Admission Rates by Sex, Age, and Union Local — The hospital admission rates by age and sex are shown in Table 2 and Figure 1. Among the females,

* The method used in adjusting rates is the direct method and can be found in any standard medical statistics text.

Table 2—Annual Hospital Admission Rates, July 1, 1956-June 30, 1957, by Insurance Status, Age, and Sex

Age and Sex	Number of Admissions		Rate per 1,000 Population			
			Unadjusted		Adjusted*	
	HIP	GHI	HIP	GHI	HIP	GHI
All Ages†	1,155	1,865	65.2	74.6	70.2	88.3
Males	291	312	75.5	67.9	76.5	83.0
Females	864	1,553	62.3	76.1	68.6	89.7
Under 45	235	531	59.5	74.3	55.5	74.9
Males	29	67	49.1	50.0	51.6	49.9
Females	206	464	61.3	79.9	56.3	80.2
45-64	782	1,230	76.9	87.7	73.8	92.4
Males	195	206	84.2	83.3	79.2	88.7
Females	587	1,024	74.7	88.7	72.5	93.3
Under 35	62	116	51.4	56.1	47.4	54.3
Males	8	20	41.7	48.2	50.4	45.7
Females	54	96	53.3	58.1	46.7	56.3
35-44	173	415	63.1	81.8	58.8	83.5
Males	21	47	52.6	50.9	52.1	51.9
Females	152	368	64.8	88.6	60.3	89.9
45-54	320	616	69.9	82.0	69.0	84.5
Males	51	84	59.0	67.7	57.1	66.0
Females	269	532	72.4	84.9	71.5	88.4
55-64	462	614	82.6	94.3	78.7	100.3
Males	144	122	99.1	99.0	96.5	106.5
Females	318	492	76.9	93.2	73.6	98.6
65 and over	135	103	105.4	112.4	105.1	111.1
Males	67	39	128.6	134.5	120.3	128.1
Females	68	64	89.5	102.2	96.1	101.1

* Adjusted to the composition by union local of the combined populations, HIP and GHI; rates for both sexes combined are adjusted for union local and sex; rates for "all ages" adjusted for union local and age (except that data for females exclude Local 10).

† Includes persons of unknown age.

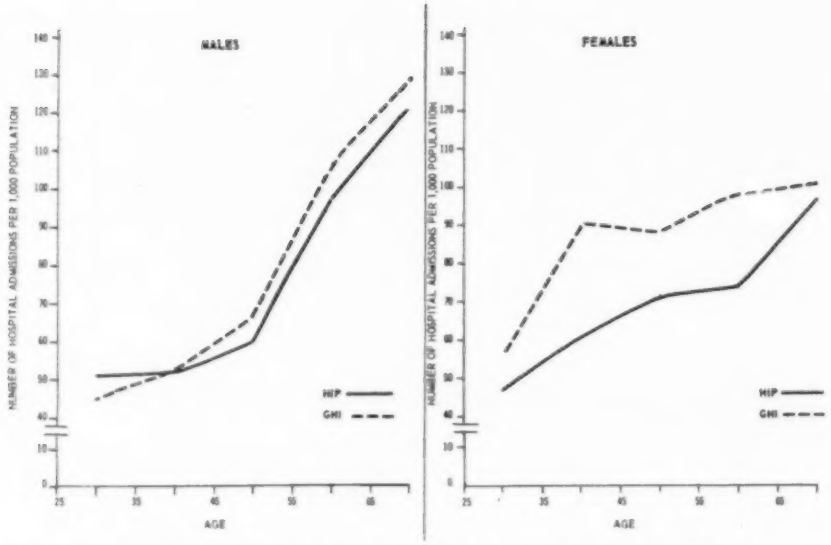

Figure 1—Annual Hospital Admission Rates, July 1, 1956-June 30, 1957, by Insurance Status, Age, and Sex (Adjusted to the Composition by Union Local of the Combined Population of the Two Groups, HIP and GHI)

who constitute the majority of members of the Dress Joint Board, the admission rate, exclusive of maternity cases, was 62.3 per 1,000 population for those enrolled in HIP as compared with 76.1 for GHI. The difference is statistically significant and increases when adjusted for age and union local composition, the rates becoming 68.6 for HIP and 89.7 for GHI.

The male admission rate before adjustment is higher in HIP than GHI but, after adjustment, the GHI rate is higher than the HIP rate. The differences, however, are not statistically significant in either case.

The lower admission rate for HIP as compared with GHI is found in all age groups for females and in three of five age groups among males. The difference between the rates for females is much greater than that for males and the greatest difference is observed in the age group 35-44 where the HIP rate is 60.3 per 1,000 population and the GHI rate is 89.9.

When the data are examined within the two large locals with sufficient admissions to produce reliable rates (Table 3) all but one of the age comparisons is in the direction of lower HIP rates. This fact assumes considerable importance when it is remembered that the majority of members of Local 22 chose HIP and the majority of Local 89 chose GHI. If existing health needs for medical care were the chief factor determining the choice of plan, it is reasonable to expect the plan having the larger proportion of members of a given local to have the greater proportion of persons in that local with health problems. Under these circumstances, one would expect HIP to have a higher hospitalization rate than GHI for Local 22 but a lower rate for Local 89. In fact, the

rates are lower in HIP for both locals. This suggests that existing health conditions were not a dominant factor in determining the choice of medical care plan.

Admission Rates for Surgical and Nonsurgical Conditions—When the data are classified into admissions involving surgery and those without surgery (Figure 2 and Table 4) it is seen that the biggest difference between the two plans occurs among the female "surgical" admissions with the HIP rate being lower at all ages. HIP also has a lower female "nonsurgical" admission rate than GHI. The absolute difference in the nonsurgical rates is not as great as in the surgical rate but both differences are significant and the relative difference is about 23 per cent for both surgical and nonsurgical admissions. Males show no differences between the two plans in either surgical or nonsurgical admissions.

Admission Rates by Transfer History and Indication of Surgery—From the inception of the dual choice program with the Dress Joint Board, members of the union were given the right to transfer from one plan to the other—at first on a monthly and then on a quarterly basis. All of the Dress Joint Board subscribers were in either GHI or HIP throughout the entire year of the study but some of them had a history of transfer prior to the study year. Table 5 compares the admission rates in those with a history of transfer and those without. It is seen that the lower HIP admission rate for surgical conditions persists both among those with a trans-

Table 3—Annual Hospital Admission Rates, July 1, 1956-June 30, 1957, for Each Union Local by Insurance Status and Age

Union Local: Age	Number of Admissions		Rate per 1,000 Population	
	HIP	GHI	HIP	GHI
Local 10, All Ages	66	92	54.1	57.4
Under 35	1	6	*	*
35-44	13	17	67.0	45.1
45-54	13	36	35.1	74.5
55-64	29	25	102.1	84.2
65 and over	10	8	138.9	*
Local 22, All Ages†	834	546	69.6	87.9
Under 35	45	20	58.2	49.3
35-44	113	96	68.8	94.9
45-54	216	175	74.5	97.9
55-64	353	221	84.6	113.0
65 and over	105	34	102.7	104.3
Local 89, All Ages†	255	1,227	56.4	71.4
Under 35	16	90	47.5	60.0
35-44	47	302	51.9	81.9
45-54	91	405	69.4	77.3
55-64	80	368	70.5	86.4
65 and over	20	61	107.0	112.3

* Rates not computed; fewer than 10 admissions.
† Includes persons of unknown age.

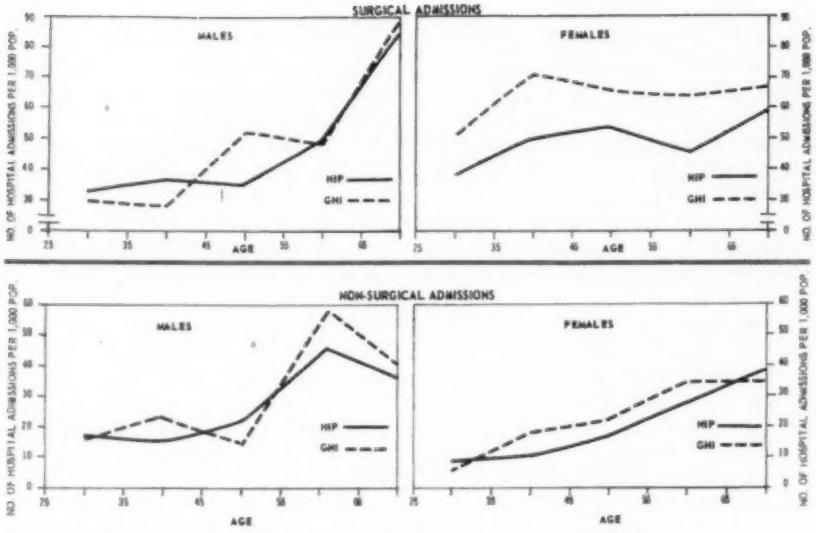

Figure 2—Surgical and Nonsurgical Annual Hospital Admission Rates, July 1, 1956-June 30, 1957, by Insurance Status, Age, and Sex (Rates Adjusted for Composition by Union Local of the Combined Populations, HIP and GHI)

fer history and among those who never transferred. The admission rate for nonsurgical conditions among those who were continuously in one or the other plan was essentially the same in HIP and GHI. There were too few admissions to compute reliable rates in HIP for nonsurgical admissions among those who transferred.

There appears to be little difference in the frequency of HIP surgical admissions among those with a history of transfer as compared with those who never transferred, but in GHI the surgical admission rate is greater among those who had transferred from HIP to GHI than among those who had been in GHI continuously.

This fact raises the question of whether the reason for the lower admission rates is due to the fact that the poorer risks tended, for whatever reason, to leave HIP and go to GHI. That this cannot account for the lower rate in HIP may be shown by the fact that even if the transfers to GHI had remained in HIP, but had surgical admission rates similar to those actually experienced in GHI, the HIP surgical rate (adjusted for union local) would be 46.0 per 1,000 which is still below that of the GHI group who never transferred (53.6). The nonsurgical admission rate would still remain essentially the same in the two plans.

Admission Rates by Diagnosis—As in the previous study[1] discharge diagnoses coded according to the three digit classification of the 1948 International Statistical Classification of Diseases, Injuries and Causes of Death were available from the basic claims records at Blue Cross. Groupings of three-digit categories were used to compute diagnostic-specific admission rates for the two samples. These rates, standardized to the age-local composition of the combined population, are shown in Table 6 for each sex. Detailed

age-sex specific admission rates are shown in Table 2.

For ease of comparison Table 7 has been prepared from Table 6. It is seen that the pattern for females differs from that for males. Among the females, the admission rate in HIP is lower than that for GHI in the majority of conditions whereas among the males there is no marked pattern in either direction. Among the females, the rates are significantly lower in HIP for benign neoplasms, influenza, pneumonia and bronchitis, diseases of the uterus and other female genital organs, and symptomatic complaints.

Only the vascular lesions of the central nervous system show a significantly higher rate in HIP than in GHI.

When the data are further classified into surgical and nonsurgical admissions and grouped into broader diagnostic categories (Table 8) there is a consistently lower rate for surgical admissions among females in HIP as compared with GHI with the exception of diseases of the skin and cellular tissue. This degree of consistency is not present among the female nonsurgical admissions or among the few categories in which the male rates can be computed.

The findings among the females in the present study are consistent with those in the first report of this series. In the majority of conditions there is a lower admission rate in HIP than in the alternate plan. The only class of conditions in which the difference between HIP and the alternate plan is significant in both studies but opposite in direction is diseases of the uterus and other female genital organs. This group of conditions had a higher rate in HIP than in Blue Shield in the first study, but a lower rate in the present study. The reasons for this are not clear. Unfortunately, the hospital claims records are only available in coded form so that it is not possible to examine the detailed diagnoses in this class.

Both the consistencies and differences revealed by these two studies emphasize the fact that if the reasons for these differences in patterns of admission to hospital in HIP and alternate plans are to be fully understood it is essential to

Table 4—Surgical and Nonsurgical Annual Hospital Admission Rates, July 1, 1956-June 30, 1957, by Insurance Status, Age, and Sex

Rates Adjusted for Union Local*

	Rate per 1,000 Population											
	Surgical Admissions						Nonsurgical Admissions					
	Both Sexes		Male		Female		Both Sexes		Male		Female	
Age	HIP	GHI	HIP	GHI	HIP	GHI	HIP	GHI	HIP	GHI	HIP	GHI
All Ages	49.0	62.1	46.1	48.6	49.7	65.6	21.2	26.2	30.4	34.4	18.9	24.1
Under 35	37.3	47.1	33.4	29.7	38.2	51.1	10.1	7.2	17.0	16.0	8.5	5.2
35-44	48.0	64.3	37.4	28.7	50.2	71.5	10.8	19.2	14.7	23.2	10.1	18.4
45-54	51.4	63.9	35.3	51.9	54.7	66.5	17.6	20.6	21.8	14.1	16.8	21.9
55-64	47.0	60.8	50.3	48.2	46.1	64.4	31.7	39.5	46.2	58.3	27.5	34.2
65 and over	67.7	74.5	84.3	87.9	58.0	66.6	37.3	36.6	36.0	40.2	38.1	34.5

* Adjusted to the composition by union local of the combined populations, HIP and GHI; rates for "both sexes" adjusted for union local and sex; rates for "all ages" adjusted for union local and age.

Table 5—Surgical and Nonsurgical Annual Hospital Admission Rates, July 1, 1956-June 30, 1957, for Study Populations with and without History of Transfer, by Insurance Status and Union Local

Unadjusted Rates and Rates for Totals Adjusted for Union Local*

History of Transfer; Union Local	HIP					GHI				
		Surgical Admissions		Nonsurgical Admissions			Surgical Admissions		Nonsurgical Admissions	
	Population	Number	Rate per 1,000 Pop.	Number	Rate per 1,000 Pop.	Population	Number	Rate per 1,000 Pop.	Number	Rate per 1,000 Pop.
With Transfer Total:										
Unadjusted	584	27	46.2	7	†	2,250	149	66.2	64	28.4
Adjusted for union local			48.3		†			67.7		29.5
Local 10	13	1	†	...	...	200	12	60.0	5	†
Local 22	363	16	44.1	5	†	764	59	77.2	28	36.6
Local 89	208	10	48.1	2	†	1,286	78	60.7	31	24.1
Without Transfer Total:										
Unadjusted	17,132	754	44.0	367	21.4	22,761	1,204	52.9	448	19.7
Adjusted for union local			42.6		19.4			53.6		21.4
Local 10	1,206	40	33.2	25	20.7	1,404	46	32.8	29	20.7
Local 22	11,614	539	46.4	274	23.6	5,447	314	57.6	145	26.6
Local 89	4,312	175	40.6	68	15.8	15,910	844	53.0	274	17.2

* Adjusted to the composition by union local of the combined population of the two groups, HIP and GHI.
† Rate not computed; fewer than 10 admissions.

know more about the circumstances surrounding the diagnosis and treatment of these cases before they are hospitalized and of cases which have not been hospitalized but bear the same diagnoses.

Duration of Hospital Stay—As in the previous study there was little difference in the average length of stay per admission in the two samples. The average length of stay per case was 11.2 days for HIP and 10.6 for GHI (Table 9). However, when the averages are adjusted for the proportion of the population in each union local in the two plans, the adjusted averages are 10.4 for HIP and 10.8 for GHI. The difference is even less when studied separately for the females and, in fact, when the distribution of length of stay is examined it is obvious that there is little difference in duration of stay in either of the two plans (Table 10).

When expressed as paid days in the hospital per 100 population, adjusted for composition of the population, the HIP figure is 74.4 and the GHI figure is 95.5. This difference is primarily a reflection of the difference in the admission rates and is present in both the surgical and nonsurgical admissions for each of the sexes.

Discussion

The findings of this study confirm those of the previous report in that a lower hospital admission rate is found among those members of the three lo-

Table 6—Annual Hospital Admission Rates by Diagnosis, July 1, 1956-June 30, 1957

Adjusted* for Age and Union Local within Each Sex

Diagnostic Category	Rate per 100,000 Population			
	Males		Females	
	HIP	GHI	HIP	GHI
All Admissions	7,655	8,303	6,864	8,967
Infective and Parasitic Diseases	†	†	31	17
Neoplasms	1,290	1,021	1,847‡	2,339‡
Malignant	558	559	408	403
Benign and unspecified	729	462	1,439‡	1,893‡
Allergic, Endocrine, Metabolic, and Nutritional	118	175	249	334
Allergic disorders	†	†	33	66
Diseases of thyroid	†	†	155	223
Diseases of Blood and Blood-Forming Organs	†	†	16	43
Diseases of Nervous System and Sense Organs	302	147	435	460
Vascular lesions affecting central nervous system	†	†	114‡	42‡
Diseases of nerves and peripheral ganglia	†	†	20	66
Diseases of the eye	†	†	232	268
Diseases of the ear and mastoid process	†	†	51	61
Diseases of Circulatory System	1,398	1,855	678‡	946‡
Rheumatic fever and rheumatic heart disease	†	†	33	57
Arteriosclerotic and degenerative heart disease	887	1,316	191	277
Other diseases of the heart	159	41	32	68
Hypertensive disease	†	†	37	51
Varicose veins	†	†	31	75
Hemorrhoids	35‡	319‡	221	310
Other diseases of circulatory system	114	137	135	109
Diseases of Respiratory System	321‡	893‡	257‡	573‡
Acute upper respiratory infection	†	†	33	44
Influenza, pneumonia, bronchitis	171	247	118‡	234‡
Tonsillectomy and adenoidectomy	†	†	48	104
Other diseases of respiratory system	150‡	513‡	59‡	191‡
Diseases of Digestive System	1,586	2,268	1,252	1,546
Ulcer of stomach or duodenum	420	477	48	130
Other diseases of stomach and duodenum	†	†	39	25
Appendicitis	†	†	169	154
Hernia	470	680	141	108
Other diseases of intestines and peritoneum	230	457	328	402
Diseases of the gall bladder	339	371	482	656
Diseases of the liver and pancreas	†	†	30	43
Diseases of Genitourinary System	1,266	934	982‡	1,313‡
Infections of kidney	464	479	212	289
Diseases of prostate	693	331	...	...
Diseases of breast	†	†	82	134
Diseases of ovary, tube, parametrium	...	...	42	52
Diseases of uterus and other female genital organs	...	...	539‡	830‡
Diseases of Skin and Cellular Tissue	219	203	174	180
Diseases of Bones and Organs of Movement	405	243	207	291
Arthritis and rheumatism	†	†	27	69
Osteomyelitis; other diseases of bones and joints	388	137	48	52
Other diseases of musculo-skeletal system	†	†	132	169
Symptomatic Complaints	474‡	134‡	96‡	215‡
Accidental Injuries	254	161	623	648

* Adjusted to the age-local composition of the combined population (HIP and GHI) within each sex.
† Rates not shown when admissions total fewer than 10 in both groups (HIP and GHI).
‡ Chances are less than one out of 20 that the difference between rates is due to random factors.

cals of the International Ladies Garment Workers Union who chose HIP than among those who chose GHI. As in the previous study, there was little difference in the length of stay per case, though the hospital days per 100 population were less in HIP than GHI, reflecting the lower admission rate in HIP.

The special significance of the lower hospital admission rate in HIP as compared with GHI arises from the fact that regardless of the choice of plan made by the union member the coverage for medical care to which he is entitled is essentially the same in HIP and GHI. In the previous study, although there was a lower hospital admission rate in HIP than in Blue Shield, in addition to differences in the organization of medical practice, coverage under the

Table 7—Comparison of Annual Hospital Admission Rates by Diagnosis for HIP and GHI

Rates Adjusted for Age and Union Local within Each Sex

A—Conditions for Which GHI Hospital Admission Rate Exceeds HIP Rate*

Males	Females
	Benign neoplasms†
	Allergic disorders
	Diseases of thyroid
	Diseases of blood and blood-forming organs
	Diseases of nerves and peripheral ganglia
	Diseases of eye
	Diseases of ear and mastoid process
	Rheumatic fever and rheumatic heart disease
Arteriosclerotic heart disease	Arteriosclerotic heart disease
	Other diseases of the heart
	Hypertensive disease
Hemorrhoids†	Hemorrhoids
Other diseases of circulatory system	
	Acute upper respiratory infection
Influenza, pneumonia, bronchitis	Influenza, pneumonia, bronchitis†
	Tonsillectomy and adenoidectomy
Other diseases of respiratory system†	Other diseases of respiratory system†
Ulcer of stomach or duodenum	Ulcer of stomach or duodenum
Hernia	
Other diseases of intestines and peritoneum	Other diseases of intestines and peritoneum
	Diseases of gallbladder
	Diseases of liver and pancreas
	Infections of kidney
	Diseases of breast
	Diseases of ovary, tube, parametrium
	Diseases of uterus and other female genital organs†
	Arthritis and rheumatism
	Other diseases of musculo-skeletal system
	Symptomatic complaints†

Table 7—(Continued)

B—Conditions for Which HIP Hospital Admission Rate Exceeds GHI Rate*

Males	Females
	Infective and parasitic diseases
Benign neoplasms	
	Vascular lesions affecting central nervous system†
Other diseases of the heart	
	Other diseases of circulatory system
	Other diseases of stomach and duodenum
	Appendicitis
	Hernia
Diseases of prostate	
Osteomyelitis; other diseases of bones and joints	
Symptomatic complaints†	
Accidental injuries	

C—Conditions for Which the Difference Between HIP and GHI Hospital Admission Rates is Very Small‡

Males	Females
Malignant neoplasms	Malignant neoplasms
Diseases of gallbladder	
Infections of kidney	
Diseases of skin and cellular tissue	Diseases of skin and cellular tissue
	Osteomyelitis; other diseases of bones and joints
	Accidental injuries

* Difference is 10 per cent or more of the lower rate in cases where one or both rates per 100,000 population consist of three or more digits, or 20 per cent or more of the lower rate where both rates consist of two digits.

† Chances are less than one out of 20 that the difference between rates is due to random factors.

‡ Difference is less than 10 per cent of the lower rate in cases where one or both rates per 100,000 population consist of three or more digits, or less than 20 per cent of the lower rate where both rates consist of two digits.

Blue Shield program was less comprehensive than in the HIP program. The present study rules out the extent of coverage as the factor responsible for the lower hospital admission rate. The explanation must be sought in other directions.

Among the factors which must be considered in seeking an explanation for the lower HIP admission rate is the possibility that some type of selection process took place when the members of the union made their choice of medical care plan. It could be postulated that a self-selection occurred as a result of basic differences between the individuals in the two study populations in their attitudes towards medical care or towards their own health status. This possibility was touched upon previously and it was pointed out that if such selection played a dominant role in determining the hospital admission rates in the two plans, one would expect the

Table 8—Surgical and Nonsurgical Annual Hospital Admission Rates by Broad Diagnostic Categories, July 1, 1956-June 30, 1957

Rates Adjusted* for Age and Union Local within Each Sex, by Insurance Status

Diagnostic Category	Rate per 100,000 Population							
	Surgical Admissions				Nonsurgical Admissions			
	Male		Female		Male		Female	
	HIP	GHI	HIP	GHI	HIP	GHI	HIP	GHI
Neoplasms	1,131	762	1,682	2,178	†	†	166	162
Allergic, endocrine, metabolic, and nutritional diseases	†	†	168	203	†	†	†	131
Diseases of nervous system and sense organs	†	†	271	317	†	†	165	143
Diseases of circulatory system	276	457	296	416	1,122	1,398	383	530
Diseases of respiratory system	†	441	107	246	†	396	150	328
Diseases of digestive system	960	1,684	864	1,127	625	588	389	419
Diseases of genitourinary system	1,074	699	822	1,157	†	†	161	157
Diseases of skin and cellular tissue	†	†	153	124	†	†	†	57
Diseases of bones and organs of movement	†	†	137	161	†	†	70	130
Symptomatic complaints	381	†	†	118	†	†	52	97
Accidental injuries	†	†	397	470	†	†	227	179

* Adjusted to the age and union local composition within each sex of the combined population, HIP and GHI; except that data for females exclude Local 10.

† Not computed; fewer than 10 admissions.

hospital admission rate to be correlated with the proportion of the membership of the two large locals who chose each plan. It would be expected that Local 22, in which nearly two-thirds of the membership initially chose HIP, would have a higher hospital admission rate in HIP than in GHI. Conversely, Local 89 in which 80 per cent of the membership initially chose GHI, would be expected to have a higher admission rate in that plan than in HIP. But, in actuality both locals had a lower hospitalization rate in HIP than in GHI.

These, however, are not the only data bearing on this point. A recent study by the Health Information Foundation and National Opinion Research Center[2] also suggests that selective processes operating at the time of initial choice of plan and related to the health of the membership did not play any large part in producing the observed differences in hospital admission rates in the two plans. In this study, matching samples of subscribers to HIP and GHI, who had been enrolled in their respective plans for at least one year prior to the survey, were questioned about the use and value of hospitals, physicians, and related matters, including costs of medical services, and about their own state of health. Among those questioned were members of the three locals represented in the present study. The results of the survey indicate that the two groups were very similar in how they rated their own health status, in their general perceptions of health, and in their attitudes towards the use and value of medical care. Also, there was no significant difference between the HIP and GHI samples in the extent to which they had experienced high cost illnesses ($500 or more) prior

to joining the respective plans, which suggests, at least, that neither of these two samples of individuals had more serious illness than the other prior to the choice of plan. There may, of course, be other unknown selective factors operating in such a way as to produce a lower HIP rate but so far as the evidence goes there is no indication of this.

Another factor acting to produce the difference in hospital admission rates of HIP and GHI enrollees could be the accessibility of hospital beds to HIP and GHI physicians. For example, if a smaller proportion of HIP doctors than of other doctors were affiliated with the hospitals in the geographic area of their patients, this could result in a lower hospital utilization rate among HIP subscribers. The situation among family physicians, for whom the question may be most pertinent, strongly suggests that this is not the case. It was found that 80 per cent of the HIP family physicians (general practitioners) have hospital affiliation as compared with 44 per cent of family physicians in New York City as a whole. If physicians having only municipal hospital appointments are excluded, the figures become 60 per cent for HIP and 39 per cent for New York City.

More specifically, it is possible to obtain the hospital admission rates, for the present study, of HIP subscribers in aggregates of medical groups classified by character of hospital appointments of the family physicians in these groups, and to compare these rates with the over-all hospital admission rate for GHI subscribers. The rate for HIP subscribers in those medical groups in which at least two-thirds of the family physicians have appointments as associate or attending physician, or clinical assistant, on the staff of one or more voluntary or proprietary hospitals was 55.7 per 1,000 population, which was 16 per cent lower than the comparable rate for all GHI subscribers in the study, 66.6 per thousand. Even in the extreme situation of medical groups in which at least one-third of the family doctors are associates or attending physicians the

Table 9—Average Duration of Hospital Stay, July 1, 1956-June 30, 1957, by Insurance Status and Sex, Surgical and Nonsurgical Admissions

Unadjusted Rates and Rates Adjusted for Age, Sex and Union Local*

	Unadjusted						Adjusted*					
	All Admissions		Surgical Admissions		Nonsurgical Admissions		All Admissions		Surgical Admissions		Nonsurgical Admissions	
	HIP	GHI	HIP	GHI	HIP	GHI	HIP	GHI	HIP	GHI	HIP	GHI
Days in Hospital Per admission:												
Both sexes	11.2	10.6	10.8	10.2	12.3	11.9	10.4	10.8	10.1	10.3	11.2	12.1
Male	12.5	11.7	11.8	11.0	13.5	12.8	11.4	12.1	10.7	11.5	12.3	13.2
Female	10.8	10.4	10.5	10.0	11.7	11.6	10.2	10.5	10.0	10.1	10.8	11.7
Days in Hospital Per 100: Population												
Both sexes	73.3	79.4	47.4	55.0	25.9	24.4	74.4	95.5	50.1	64.1	24.3	31.4
Male	94.7	79.1	52.9	47.6	41.8	31.5	89.3	100.4	50.7	56.1	38.7	44.2
Female	67.4	79.4	45.9	56.6	21.5	22.8	70.6	94.3	50.0	66.1	20.7	28.2

* Adjusted to the age-local or the age-sex-local composition of the combined population of the two groups, HIP and GHI, except that data for females exclude Local 10.

Table 10—Duration of Hospital Stay by Insurance Status and Sex, July 1, 1956-June 30, 1957

Percentage Distribution of Admissions by Number of Days in Hospital

	Both Sexes		Males		Females	
	HIP	GHI	HIP	GHI	HIP	GHI
Total Admissions						
Number	1,155	1,865	291	312	864	1,553
Per cent	100.0	100.0	100.0	100.0	100.0	100.0
Days						
1	5.5	5.5	5.5	7.7	5.4	5.0
2- 3	14.1	13.9	12.4	12.2	14.7	14.2
4- 5	10.9	12.4	9.6	13.5	11.3	12.3
6- 7	10.0	10.8	10.0	10.3	10.1	10.9
8- 9	12.8	11.9	11.0	10.9	13.4	12.0
10-19	33.2	33.5	32.6	28.8	33.4	34.4
20-35	9.9	9.5	15.8	13.8	7.9	8.6
36 or more	3.5	2.5	3.1	2.9	3.7	2.4

hospital admission rate (62.2) is still less than the GHI figure. A similar difference was found using data from the first hospital study comparing HIP and Blue Shield. These data certainly do not lend any support to the contention that physician access to hospitals accounts for any large part of the observed differences in admission rates.

If, then, no significant differences have been shown in the extent of medical coverage of the HIP and GHI subscribers from the three locals of the ILGWU, or in the attitudes toward questions of health and medical care of samples of these populations, and if there is no question of accessibility of hospital facilities for patients of HIP doctors, where does the search for an explanation of differences in hospital admission rates lead? Let us consider some alternative hypotheses.

One may postulate that the availability in one place of diagnostic facilities and of consultations in the medical group centers of HIP, as contrasted with solo practice, should result in a lower hospitalization rate for persons enrolled in HIP since there would be less need to admit the patient for diagnostic purposes.

Conversely, the relative unavailability of diagnostic facilities in the nongroup practice situation may lead the doctor or his patient to feel that the best place for the patient is in the hospital where he can be properly cared for and where his hospital insurance will relieve him, at least in part, of financial worries.

Another possibility, as was pointed out in the first study, is that for some conditions the lower admission rate for HIP enrollees represents a failure to diagnose or treat the condition when it existed, though it is difficult to conceive of this happening for such a variety of conditions. Then, again, the medical philosophy concerning the need for hospitalization of certain conditions may be different in HIP than in other settings. Clearly, one needs to look more closely at the reasons for hospitalization or lack of it.

In this context, it is essential to recognize that there are no absolute standards by which one can say what the hospitalization rate should be in a given situation. It does not follow that a high hos-

pitalization rate is necessarily bad or that a low rate is good. The ultimate criterion must be the health of the patient and this must necessarily be the subject of another study.

Since, as described earlier, the methods by which the doctors are compensated for their service differ in the two plans, it is conceivable that this may play a part in producing the observed differential in the admission rate in HIP and GHI. The non-HIP doctor's fee is directly linked to the service rendered whereas in the HIP case the doctor is compensated by the medical group from the capitation received from HIP. Whether and to what extent this difference in the mechanics of payment of the doctors influences the hospitalization rate cannot be determined directly from the present study.

These are hypotheses. They need to be tested to determine whether they represent the true state of affairs. To test them, we shall have to consider how the fact of hospitalization relates to the whole spectrum of diagnosis and treatment. It will be necessary to collect more specific facts on the reasons for hospitalization and on what was done for patients prior to hospitalization. We shall also have to know what is done for patients who are not hospitalized. We shall want these facts in as many different kinds of medical care settings as possible. It may well be that those in the best position to gather such facts are the universities or the public health agencies whose concern is the community health generally.

Summary

This study sets forth the comparative hospitalization experience of members of the Dress Joint Board of the International Ladies Garment Workers Union under two different medical care plans for which they were eligible under a dual choice arrangement. The two medical care plans were Group Health Insurance (GHI) and the Health Insurance Plan of Greater New York (HIP). Members of the two study populations were all employed in the same industry and the medical care to which they were entitled was essentially the same under the two plans. This medical care covers home, office, and hospital services. The study population enrolled in GHI received its medical care, in the main, on a fee-for-service solo practice basis. The study group enrolled in HIP received its medical care through medical groups which receive payment on a capitation basis. Both populations were insured against hospital costs under the same type of contract with Blue Cross. It was found that:

1. The annual hospital admission rate, adjusted for population composition of the two study groups, was 70.2 per 1,000 for the population covered by HIP and 88.3 per 1,000 for GHI.

2. The biggest difference between the two plans in hospital admission rates occurred among female surgical admissions with HIP having a lower rate. While the absolute difference in the female nonsurgical rate was less than for the surgical admission, both rates were about 23 per cent lower in HIP than in GHI.

3. When the data are analyzed by diagnosis, in the majority of conditions there is a lower admission rate for females in HIP than in GHI. These findings are, in general, consistent with a previous report comparing hospital admission rates in HIP and Blue Shield. The number of males in the present study is small and they showed no marked pattern in the direction of either lower rates in HIP or in GHI.

4. There is little difference in the average length of stay per admission in the two study groups, being 10.4 days for HIP and 10.8 for GHI after adjustment for population composition.

5. The average number of paid days per 100 population, after adjustment, was 74.4 for HIP and 95.5 for GHI. This difference is primarily a reflection of the difference in the admission rates.

These findings are discussed, and possible explanations considered.

ACKNOWLEDGMENT—We wish particularly to express our thanks to Arthur Harlow and Kate Black of Group Health Insurance and to Paul G. Drescher and Harry Sesan and their staffs in the Associated Hospital Service of New York. Their cooperation in making the necessary records available made this study possible.

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Appendix Table A—Study Populations: by Insurance Status, Union Local, Age and Sex

Age and Sex	HIP-Insured				GHI-Insured			
	Total	Local 10	Local 22	Local 89	Total	Local 10	Local 22	Local 89
All Ages	17,716	1,219	11,977	4,520	25,011	1,604	6,211	17,196
Males	3,856	1,214	1,899	743	4,596	1,589	560	2,447
Females	13,860	5	10,078	3,777	20,415	15	5,651	14,749
Under 35	1,206	96	773	337	2,068	162	406	1,500
Males	192	96	25	71	415	161	12	242
Females	1,014	...	748	266	1,653	1	394	1,258
35-44	2,743	194	1,643	906	5,076	377	1,012	3,687
Males	399	193	64	142	924	376	35	513
Females	2,344	1	1,579	764	4,152	1	977	3,174
45-54	4,580	370	2,899	1,311	7,509	483	1,787	5,239
Males	864	369	299	196	1,240	481	105	654
Females	3,716	1	2,600	1,115	6,269	2	1,682	4,585
55-64	5,590	284	4,171	1,135	6,511	297	1,955	4,259
Males	1,453	283	962	208	1,232	296	248	688
Females	4,137	1	3,209	927	5,279	1	1,707	3,571
65 and over	1,281	72	1,022	187	916	47	326	543
Males	521	72	409	40	290	47	104	139
Females	760	...	613	147	626	...	222	404
Unknown	2,316	203	1,469	644	2,931	238	725	1,968
Males	427	201	140	86	495	228	56	211
Females	1,889	2	1,329	558	2,436	10	669	1,757

Provision of dental care for many handicapped patients requires a carefully planned dental program. In turn, such a program requires the coordination of various agencies and interests on a community basis. This important topic is explored in the paper presented below. Special attention is given to the role of the dentist and his relation with the various involved groups.

PROVIDING DENTAL CARE FOR THE HANDICAPPED PATIENT

Manuel M. Album, D.D.S.

THERE IS AT PRESENT a certain degree of understanding on the part of the general public as well as the treating professions of the problem of the handicapped. For example, many individuals are aware of the term cerebral palsy and have accepted these patients. Education, television programs, and the general appeal of these children have helped accomplish this feat. The patient with some degree of mental retardation, mongolism, or hydrocephaly, for example, has not yet reached this level of acceptance or approval on the part of the public or many of the professions. Disturbances in the field of muscular dystrophy and multiple sclerosis are more of a mystery to the same individuals. When this feeling exists, the function of providing a complete care program which includes dentistry sometimes never gets off the ground.

In developing program plans for the physically or mentally handicapped patient, two possible approaches become evident. One is based on developing community services in dental clinics or offices for the patient who can be handled on an outpatient basis, and second, the development of a hospital service for those patients unable to be treated under office procedures.

To solve a complete segment of the problem of providing dental care to the handicapped, it is necessary to think in terms of clinical facilities available to all types and degrees of the handicapped population. These dental clinical facilities must be accepted by the lay and professional bodies determining the ancillary treatment needs of the patient. Too often the reason many programs never seem to start is because an executive director of a program for the handicapped or an administrator of a hospital is either totally ignorant of the existing problem or else it has never been interpreted correctly to him.

The task of setting up a carefully planned dental program under the auspices of a crippled children's society or a hospital group takes infinite patience and initiative on the part of the dentist or some other responsible individual. It must be coordinated to include all phases of civic need as well as community responsibility.

When the dental program for cerebral palsy patients was first set up at the Philadelphia Society for Crippled Children and Adults many years ago, as well as when the program was formulated at the Children's Hospital of Philadelphia, the very first step was to evaluate the existing case load of patients in the area as to their basic

dental needs. Starting with these needs, it was then possible to explain the problems to the parents: How poor mastication, badly decayed teeth, severe gum disturbances, and other related aspects of the dental problem would influence the progress and prognosis of the child in relating his physical and mental background. Not only must one educate the director of such a society or hospital; it is essential to include a dentist as a member of the professional advisory committee of a program or its sponsoring agency in order to establish the total success of the dental program. The presence of the dentist on this committee will make it possible not only for the other professions to become aware of the need for total dental care, but will also allow the dentist an opportunity to stimulate and to further a more comprehensive dental program for the handicapped patient.

One might suppose that the next step is to set up the actual physical plant to care for the patients' dental needs. However, before this can be done, several factors must be considered. The local dental society should know that this type of service is to be offered. This cooperation will not only give more stature to the program as well as to the dentist directly involved, but the approach will also create a better liaison between the agency sponsoring the program and the local dental group.

The parent groups affiliated with a society or program for handicapped children should be informed of the need to provide a complete dental service for their children. This may be the first time that the parents become aware of the interest by a dental person in their child. The dental needs may not be fully understood and the director of the program and the dentist definitely should present and explain the dental program at a meeting of the parents. This will give the dentist an opportunity to acquaint the parents with the dental problems that befall their child and should enable the parents to better understand their child's condition and what can be done dentally for him. Furthermore, it impresses the parents with the important fact that no mater how severe the child's physical or mental handicap may be, he or she can receive correct and proper dental treatment. For many parents this may be the very first time that some one has informed them honestly of this fact. Such a talk will create excellent relations between the parents and the program by making them realize that the sponsoring group is interested in the total care of the patient and is doing everything possible to achieve this treatment need.

A good relationship established between a parent group and the sponsors of a program will go far in assisting the dentist to equip a modern dental clinic properly. This group and other interested groups already assisting a program, such as Lions or Rotary, will be the source of financial aid in setting up the physical plant for dental treatment and also in meeting or solving special dental needs and problems.

The policy of the program should be to encourage the families of handicapped patients to have the care provided by the family dentist if he is already treating the child satisfactorily. Where this is impossible or there is the need for hospitalization, the child should be admitted to the dental clinic facilities. Unless such a philosophy is used in treating patients, unnecessary financial and schedule burdens will arise for the program geared to the child who cannot be treated favorably from a usual dental standpoint.

It should be realized that patients for the program will come not only from the program's own case load, but also through the members of the local dental society who now have the opportunity of placing the many calls coming

into their offices for dental aid to the handicapped child.

The schedule of patients for the program may necessarily have to be on a one-day-a-week basis or even one-evening-a-week to accommodate the parents who cannot bring their child during a working day. As the case load grows, one can then increase the number of mornings or days set aside for treatment as well as the number of dentists interested in giving their services for this project.

To help staff this program, ancillary help can be obtained from volunteer agencies as well as from the dental hygienist organization whose members are more than willing to assist these patients.

The hospital program for the handicapped patient is of a different nature and must be geared on a mutual assistance basis. The administrator and the surgeon-in-chief of the hospital must be made aware of the need for operating room privileges to better service the difficult and hard-to-manage handicapped patient who is untreatable on an office basis. This is the only way a complete dental service can be obtained in extreme cases. With a proper understanding of the hospital needs by the administrative staff, the dentist is then in a position to provide a much-needed hospital service. The cooperation of the surgeon should place the dentist on an equal footing with regard to operating room privileges. If this feature cannot be achieved, there is no point in carrying out a definite hospital program. It must be remembered that definite time must be set aside in a hospital for the treatment of these patients under a general anesthetic, and a dental case should not be removed from the operating room schedule because of the whim of any individual. To work properly, dental cases must be assigned on a set schedule which will not affect the dentist's caring for his patients. Such an understanding will allow any minor problem presented by the hospital staff to be settled quickly and efficiently.

On the other hand, a dentist utilizing hospital operating room privileges for handicapped patients must be schooled thoroughly in operating room technics and procedures. There is no need for the dentist to look foolish or to take an unnecessary period of time because of inefficiency and inability on his part. The cooperation of hospital and dental service can only come about as a result of complete mutual awareness. This is what makes working in a hospital program so gratifying.

The admittance of a handicapped patient should not be limited by age or height, but should rather take account of mental age. This will make it possible to give service to all patients regardless of age and not deprive worthy individuals of dental treatment.

Needless to say, as much as a hospital is interested in providing a service for the handicapped patient, finances and hospital budget do enter the picture. To cover the costs even for a ward case of operating room, anesthesia, laboratory tests, room, and other charges, the hospital must stand some or all of the expense. In Philadelphia this problem has been solved in one of two ways. First, Blue Cross has agreed that when a handicapped child is involved, the subscriber is entitled to have all hospital costs covered on a semiprivate basis. For the parent who has Blue Cross, this is a lifesaver since many of these parents have limited financial resources and cannot afford this extra burden. Second, to pay for indigent patients, the State of Pennsylvania under the leadership of Dr. Linwood Grace has set up a program to help the hospitals recoup some of the losses involved in the hospital treatment of a handicapped patient. Once a hospital has been certified by the State

Health Department as having a definite program for the handicapped, applications for the hospital care of these patients can then be forwarded to the Dental Section of the State Health Department. Approval of a hospital service as well as a patient's application is quickly given by Dr. Grace's department. The sum of $50.00 is authorized by the State Health Department for each patient seeking hospital dental care. This authorization is given to the hospital before the dental procedures are performed. With this financial assistance, the hospitals do not lose too much, as otherwise they would be receiving nothing at all. It should be possible to set up similar programs with all dental directors. Yet this is but one aspect of the State of Pennsylvania's endeavor to deal with the problems of these children. Another phase of assistance the Dental Health Department has undertaken is to support teaching programs on dentistry for the handicapped. The Health Department will underwrite the tuition of a limited enrollment course on dentistry for the handicapped patient. Dentists from all over the state as well as from neighboring states have obtained instruction in treating and caring for the handicapped patient in the course which I present at the School of Dentistry of the University of Pennsylvania. This enables a state to interest dentists in the over-all problem of the handicapped.

To initiate a thorough understanding of the dental problems of the handicapped patient, the local dental society should set up within the framework of its committees a subcommittee on the handicapped. The purpose of such a committee would be to acquaint the dental society, through its Council on Dental Health, with the various problems associated with these patients, as well as to serve as a clearing house for all matters brought before the society on this subject. The Health and Welfare Council of the city will work closely with the dental society on all matters of a city-wide nature, as is the case in Philadelphia. In addition, the State Dental Society has set up a special committee on the handicapped patient. The membership of this committee is geographically distributed. The purpose of a state committee is to interest dentists in this problem on a state-wide basis as well as to help organize working clinics throughout the state.

It is extremely important for a dentist interested in the handicapped patient to initiate community activity with this program. Workshops are being organized to stress the need for dental treatment of the handicapped patient. They can be aimed at the nurses, physicians, and parents interested in providing the best service for the handicapped child. Therefore, each individual attending such a workshop becomes a self-educated apostle of dental treatment for these patients.

Sir Thomas Browne, the great humanitarian and philosopher, said, "Look contentedly upon the scattered difference of things, and expect not equality in lustre, dignity, or perfection. But in the suspension of what will be in the world to come, the last may be the first and the first the last; and the just, obscure on earth shall shine like the sun in heaven, where reality shall rule, and all shall be as they shall be forever."

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This is a study of the chemistry of bromamines and their bactericidal action. Bromine is used in the sterilization of swimming pools and this information is intended to encourage its use.

THE BROMINATION OF SWIMMING POOLS

J. K. Johannesson, M.Sc., A.R.I.C.

DURING the course of an investigation upon the chlorination of sea water swimming pools, it was found that the liberation of bromine from the naturally occurring bromide, which is normally present to the extent of 70 ppm, caused the formation of bromamines as well as chloramines in the presence of nitrogenous matter from the bathing load. A study was made of the chemistry of these bromamines and their bactericidal action, and it was felt that the information so obtained should be made available in a condensed form to those who use bromine to sterilize the water of swimming pools, and to possibly encourage the extension of its use.

Bromine has been used for the sterilization of pools in Illinois[1] and is referred to in the official publication of the American Public Health Association on "Swimming Pools and Other Bathing Places,"[2] in which a request is made for further investigations upon the use of this element for such purposes.

A limitation on the use of bromine for sterilizing in pools has been the lack of knowledge of the behavior of this element in its reactions with ammonia and the resultant formation of combined bromine, as in the reaction of chlorine with ammonia yielding chloramines together with the well known "break point" reaction. A further difficulty has been the lack of methods to determine whether or not a residual due to bromine was free bromine or bromamine, i.e., combined bromine. These problems have been overcome in the author's laboratory and it is the object of this paper to outline the bactericidal effects, analytical chemistry, and the reactions of free and combined bromine in swimming pools.

Chemical Behavior of Free and Combined Bromine in Pools

Bromine in water hydrolyzes according to the equation

$$Br_2 + H_2O \rightleftarrows HOBr + H^+ + Br^- \quad \text{Eq. 1}$$

for which the equilibrium constant is 5.8×10^{-9}.

Further

$$HOBr \rightleftarrows H^+ + OBr^- \quad \text{Eq. 2}$$

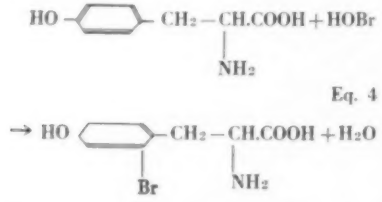
according to the pH, and molecular bromine will form perbromides of the formulas Br_3^- and Br_5^- with equilibrium constants 16.0 and 40.0, respectively.[3]

At the pH values found in pools and the concentrations of bromine used, the main entities involved are hypobromous acid and hypobromite, the proportions of each depending upon the pH of the water according to the equation.[3]

$$\frac{[OBr^-]\,[H^+]}{[HOBr]} = 2 \times 10^{-9} \quad \text{Eq. 3}$$

and also to a lesser extent the ionic strength of the solution.

Hypobromous acid and hypobromite are strong oxidizing agents. Thus urea is oxidized to nitrogen and carbon dioxide with the formation of bromamines as intermediate products. Amino acids are also attacked to form initially N-Br compounds and finally keto-acids. Aromatic amino acids are also attacked in the nucleous



Eq. 4

with subsequent reaction of hypobromite and the amino nitrogen as above.

Hypobromite may hydrolyze further to form bromate by the reaction

$$3.OBr^- \rightarrow BrO_3^- \qquad \text{Eq. 5}$$

and this bromate may accumulate in the water of swimming pools. It is a relatively innocuous compound at these low concentrations and probably makes little contribution to the sterilizing of the water. This bromate is, however, of importance because it will react with acid orthotolidine to give a false reading.

At neutral pH values, bromine in the above forms will react with ammonia according to the over-all equation

$$3\ OBr^- + 2NH_3 \rightarrow N_2 + 3H_2O + 3Br^-. \qquad \text{Eq. 6}$$

This reaction is quantitative in the presence of an excess of hypobromite and has been used by many workers to determine ammonia.[4] In the presence of less bromine than is required by the above reaction, there are formed bromamines, according to the respective reactions

$$OBr^- + NH_3 \rightarrow NH_2Br + OH^-. \qquad \text{Eq. 7}$$

$$OBr^- + NH_2Br \rightarrow NHBr_2 + OH. \qquad \text{Eq. 8}$$

The proportions of monobromamine and dibromamine appear to be a function of the excess of ammonia present, and addition of further ammonia to a solution containing both forms causes a rapid change of the dibromamine to monobromamine. It appears that dibromamine will not exist alone in solution, but only in equilibrium with both monobromamine and ammonia, and that there is a minimum ratio of dibromamine to monobromamine below which there is a rapid over-all decomposition until a more stable ratio is attained.

The author[5,6] has shown that the bromamines have characteristic absorption spectra in the ultraviolet region at less than 300 mμ and it is examination of these spectra that has lead to the above conclusions. The absorption spectra have also shown (together with polarographic data) that monobromamine forms an ammonium ion at the pH values found in the water of swimming baths. This is to be contrasted with monochloramine which according to Weil and Morris[7] forms an ammonium ion only at a pH of near 1.0. This property of ammonium ion formation is expressed quantitatively by the mass action equation

$$NH_2Br + H^+ \rightleftarrows NH_3Br^+. \qquad \text{Eq. 9}$$

The value for the dissociation constant is conveniently expressed similarly to the pH notation, i.e., as $pK = -\log K_a$. The value of pK_a for monochloramine was found by Weil and Morris[7] to be about 1.0 and that for monobromamine was found by the author to be 6.5. It follows from this that at a pH value equal to the pK_a value, the solution will contain equal amounts of the base and the ion, thus at a pH of 6.5 the monobromamine present will be in equal amounts as the monobromamine base, and the monobromammonium ion. At pH 7.5 approximately 10 per cent will be present as the ammonium ion and at pH 8.5 approximately 1 per cent. By contrast, monochloramine at pH 7.5

will have less than one-millionth of itself present as the monochlorammonium ion and at pH 8.5 one-tenth of this quantity again.

Chemical Reactions of the Bromamines

Monobromamine is a strong oxidizing agent, stronger than monochloramine, thus at a pH of seven monobromamine will react with compounds such as methyl orange, methyl red, neutral orthotolidine, sodium arsenite, and phenyl arsenoxide. This difference in reactivity may be explained by the presence of the monobromammonium ion at this pH value as explained above, which ion will tend to react by release of a positively charged bromine atom

$$NH_3Br^+ \rightarrow NH_3 + Br^+ \qquad \text{Eq. 10}$$

having strong oxidizing properties (Equation 10). This would also provide an explanation for the reaction of monobromamine with dimethylamine at neutral pH values to give a mixture of N-bromodimethylamine and monobromamine; monochloramine not giving such a reaction under these conditions.

Similarly to free and combined chlorine, bromine and its compounds give rise to currents in amperometric apparatus and this may be used for their detection and estimation. Both free chlorine and bromine give currents commencing at a greater applied voltage than +0.8 versus the Standard Calomel Electrode (SCE), the exact value being a function of pH and the condition of the electrodes. The current wave for monobromamine commences near +0.5 volt versus the SCE and dibromamine between these two values. As solutions containing only dibromamine have not been prepared, it has not been possible to make this determination. The current wave for monochloramine commences near +0.1 volt versus the SCE and dichloramine at even more negative values.[8]

Break Point Phenomena

The characteristic feature of the chlorination of water containing ammonia is the formation of what is known as the break point. This is too well known a reaction to be discussed for chlorine, but bromine also exhibits similar behavior and requires discussion.

Brooke[9] treated solutions of ammonia with increasing doses of bromine, measuring the residual after a set time and found a break point type of curve. Houghton[10] chlorinated water containing both ammonia and bromide and found that these mixtures were more strongly bactericidal than those from chloramine alone. He also added bromine to ammonia and obtained a break point curve but was uncertain as to the nature of the residuals obtained under the curve. The author has found that bromine exhibits a typical break point reaction, the break occurring exactly at the equivalence point for the complete oxidation of ammonia according to the equation.[6]

There are, however, some important differences between the break point reaction as given by bromine and that given by chlorine. First, bromine does not appear to form in aqueous solution the bromine analogue of chlorine nitrogen trichloride which latter substance, according to Palin,[11] is responsible for much of the eye complaints and the chlorine smell around swimming pools. Second, bromamines and free bromine cannot co-exist other than momentarily at the pH of swimming pools, unlike chlorine and chloramines, so that in the presence of even a slight excess of free bromine the break point is almost instantly produced. Third, dibromamine is always present at low ammonia to bromine ratios even at high pH values. At present it is possible only to detect but not estimate dibromamine by amperometric methods as will be indicated in a later section.

Bactericidal Action of Bromine and Bromamines

Beckworth and Moser[12] made a comparative study of the germicidal efficiency of chlorine, bromine, and iodine upon Escherichia coli and suspensions of soil bacteria in tap water. It is apparent from their experimental data that they worked, apparently unaware, with both free and combined chlorine and bromine, since they prepared their bacterial suspensions by adding 24-hour broth cultures to tap water. Consequently, they found that at low concentrations of the free halogens bromine was a more efficient germicidal agent than chlorine, that is to say, in the light of the evidence presented in this paper, that bromamine was more efficient than chloramine, a fact which has been confirmed by the author.

Tanner and Pitner[13] investigated the effect of bromine on a range of vegetative and sporeforming bacteria at various pH values, measuring the bactericidal efficiency in terms of the parts per million of bromine required to give a complete kill in 30 minutes. They found that the bromine was most active at pH 3.5–4.0 and that the spores required much greater doses than vegetative organisms. Thus E. coli was killed in this time by 0.15 ppm, Salmonella typhi by 0.06 ppm, while spores of Bacillus subtilis required over 450 ppm of bromine. The amount of presented experimental data does not allow critical appraisal of the possible presence of nitrogen compounds.

Wyss and Stockton[14] studied the germicidal action of bromine using the methods employed by Marks, Wyss, and Strandskov[15] for an investigation of the germicidal action of chlorine. The former workers investigated the action of free bromine on washed suspensions of spores and vegetative forms of B. subtilis and Pseudomonas fluorescens studying the effects of temperature, concentration and pH. Analysis of the pH data revealed that molecular bromine at pH 3-5 was the most effective form and that the hypobromite ion was a very poor disinfecting agent against spores. Only at pH values greater than nine was the reaction of the bromine slow enough to permit investigation of the action of bromine on vegetative cells.

These workers also prepared bromamine by addition of ammonium salts to bromine solutions at pH 7.0 and tested the resultant solution on B. subtilis spores and showed that the reactivity was of a similar order to that of free bromine.

Houghton[10] found that chlorination of water containing both ammonium salts and bromide ion yielded a solution of greater bactericidal ability than solutions prepared in the absence of bromide ion. The author[16] has shown that solutions prepared as described above contain a preponderance of chloramine with some bromamine.

Experimental work by the author[17] on the action of monobromamine on suspensions of E. coli and Streptococcus faecalis indicates that it is nearly equivalent in killing power to free bromine, and further in the presence of sufficient bacterial cells, bromine or monobromamine is converted to other forms of N-Br compounds of much lower bactericidal power, the reaction proceeding

$$NH_2Br + R_2NH \rightarrow R_2NBr + NH_3. \quad \text{Eq. 11}$$

The reaction between dimethylamine and monobromamine has been demonstrated both spectrophotometrically and polarographically, and the reaction between monobromamine and the bacterial cells has been followed polarographically. It will be remembered that the pK_a of monobromamine is 6.5 which will give a positive ion at these pH values. The bactericidal effects of monochloramine are very poor by comparison and it is possible that the almost

absence of the monochlorammonium ion may account for this.

Whitlock[18] has shown that when chlorine water is added to suspensions of bacteria in buffered ammonium salt solutions there is some rapid destruction of bacterial before the free chlorine is converted to chloramine. Further, Ingols, et al.,[19] have shown that there may be some resuscitation of chloramine-inactivated bacteria by cysteine, but not of chlorine-inactivated bacteria. These effects have not as yet been investigated for the bromine compounds.

Analytical Methods

Both free and combined bromine react with the conventional reagents for free chlorine determination. Acid orthotolidine may also lead to error if traces of bromate have been formed in the water.

The nature of the residual is best determined by the amperometric method at zero applied potential, i.e., in an appartus such as the Wallace and Tiernan amperometric titrator. This procedure is briefly as follows.

To 200 ml of water in the titrator is added a quarter of a gram of sodium bicarbonate and the meter reading is noted; one ml of molar ammonium sulfate solution is now added. If free bromine were present it is converted to monobromamine with a reduction in current to approximately a quarter of the original reading, and if bromamine had been present originally, then there would, of course, be no change in the current subsequent to the addition of the ammonium sulfate solution. Iodine is now added and the solution is titrated with phenyl arsenoxide in the usual manner.[20] The author is describing this method in detail elsewhere.[21]

Both free and combined bromine will react with the usual free chlorine reagents and these may be used for estimation in those cases where it is not desired to know the form of the residual.

The presence of bromate in the water will cause interference with the acid containing reagents, and may indicate a residual when actually no active bromine is present at all.

The neutral reagents, such as o-tolidine, dimethylnaphthidine and diethylphenylene-diamine are useful, especially the last, which is a modified form of Palin's FAS method.[22]

Conclusions

An account of water treatment with bromine has been presented, and it has been shown that the action of this element in this regard is similar to that of chlorine. With ammoniacal nitrogen a break point reaction is observed but the decomposition of the bromamines is more rapid than that of the chloramines, and further no bromine analogue of nitrogen trichloride with its troublesome properties is formed. Unlike monochloramine, the bactericidal properties of monobromamine are very strong, almost equal to those of free bromine at the pH values found in swimming pools. This may be related to the presence of the monobromammonium ion NH_3Br^+ which has a pK_a of 6.5 compared with the value of approximately 1.0 for the monochlorammonium ion NH_3Cl^+.

The writer considers it likely that the very strong bactericidal properties of the bromamines may be exploited by the use of a small combined bromine residual since there is no need to reach break point in order to achieve strong disinfectant properties in the bathing water. With chlorine it is necessary to add a quantity in excess of the break point to obtain such sterilizing properties. Use of this property of bromine could make it more economical than chlorine.

The type of residual, i.e., free or combined bromine, is readily deter-

mined by the use of standard amperometric apparatus, where the addition of ammonium salt causes a change in meter reading for free bromine but not for combined bromine, and the quantity present is determined by titration with phenyl arsenoxide. Both forms of active bromine give immediate reaction with orthotolidine and a chlorine comparator may be used for measurement with adjustment for the different equivalent weights. For practical purposes a direct reading on a chlorine comparator with either free or combined bromine will give bactericidal effects similar to the same concentration of free chlorine at the same pH.

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The July issue carried a critique by T. D. Sterling of a paper by Drs. Pasamanick and Knobloch originally published in the Journal in 1958. In the following paper, the latter reply to their critic and rebut his arguments.

SEASONAL VARIATION IN THE BIRTHS OF THE MENTALLY DEFICIENT—A REPLY

Benjamin Pasamanick, M.D., F.A.P.H.A., and Hilda Knobloch, M.D., Dr.P.H., F.A.P.H.A.

OUR REPLY TO Dr. Sterling's criticism[1] of our paper[2] in the July issue of the Journal will center largely upon three major areas of error in his presentation. First, he apparently does not comprehend the inductive as contrasted with the deductive properties of data analysis. Second, he erroneously applies principles of sampling theory and statistical inference to large-scale population data. Third, he does not seem to be acquainted with some well-established health information.

It should be apparent after perusal of our paper that nowhere in his critique does Sterling discuss the main thesis of the study, the only hypothesis truly tested in this investigation. What he does discuss as if they were the entire contents of the paper are the preliminary thoughts, observations and discarded hypotheses which led to the hypothesis finally tested. This was not an ad hoc hypothesis. Sterling admires our "honesty" in discussing our motivation for the investigation and in describing the steps we went through. But honesty is quite beside the point, since inclusion or omission of these initial thoughts does not affect the validity of the core of the study.

Our original interest was raised by the possible relationship of maternal influenza to the development of mental deficiency in the offspring. The study of close to 6,000 admissions to a state school demonstrated that the 1918-1919 epidemic of viral influenza did not result in an increase in admissions for mental deficiency. Furthermore, it agreed with the findings, made over many decades, of a large number of other studies that admission rates were higher for children born in the winter months. Since the critical period for cerebral organization is in the third fetal month, we postulated quite simply from these data that something damaging to the brain may have occurred during the summer months. For a number of reasons discussed in the body of the paper we chose temperature as the most pertinent variable that might be considered and constructed the hypothesis that the hotter the summer, the more likely it was to be followed by an increased risk of developing mental deficiency. We found this hypothesis to be overwhelmingly supported, and this was the only excuse for the paper, since we gave references to the many investigations we found which had already reported

a higher risk in winter-born children. Indeed, had every statement made in Sterling's criticism been correct and had all the observations, inductions and relationships which led to the formulation and testing of our temperature hypothesis been in total and complete error, the significance of the findings of an association of higher summer temperatures with an increased risk of developing mental deficiency would still remain intact and untouched.

In more formal terms, inductively using our observations and those of others on seasonal variations in mental deficiency and intelligence, and data on critical periods in cerebral organization, we arrived at a hypothetical general principle that high summer temperatures were the responsible agent. We then continued in the usual scientific fashion to test this general principle deductively by comparing births of mentally defective children exposed to the risk of high as contrasted to low summer temperatures. It is this scientific process which Sterling apparently fails to comprehend. The infection hypothesis was included merely to indicate the door through which we entered upon this study. It is for this reason that we omitted discussion of our test of the hypothesis that the pandemic of influenza might result in an increased risk of admission, since it was irrelevant to the chain of inductive reasoning.

In view of the fact that Sterling apparently accepts our findings in relation to the crucial hypothesis of the study—since he leaves them undiscussed—his critique would appear to be quite irrelevant and we would be justified in ending our own discussion abruptly at this point. We must differ, however, with the editorial comment at the head of the paper that his discussion can be described as a critical analysis, so that some of his premises and pretensions require further comment. We feel it is essential to call attention to some surprising errors and to clarify a number of points for the unwary reader and for investigators from other fields.

We must comment first on a matter which makes up a large bulk of Sterling's paper and which concerns the comparison of the rates for summer and winter. First, summer was chosen because it was at the opposite end of a seasonal continuum. That summer also had the lowest rate might very well have been pure chance. Although specifically stated in our report (page 1202), the point was not expanded because of limitations of space. In Sterling's comments on the logic of testing hypothesis (pages 962-963) he discusses a model in which the alternative to the null hypothesis specifies the direction of the difference. An investigator employing this model (that is, using the "one-tailed" test of significance) would indeed be constrained to disregard any difference, however large, which his data might show in the direction opposite to prediction. On the other hand, regardless of stated predictions, if the investigator plans in advance of the outcome to use a "two-tailed" test of significance (as we did) the alternative to the null hypothesis is simply that the samples differ (in either direction) more than would be expected of samples from the same population. The investigator is justified in applying a test of significance to a comparison selected independently of the outcome regardless of the over-all significance of the data. The comparison we selected, between summer and winter, was made, as planned, on the basis of the opposite expectation. It was not chosen on the basis of the outcome, highest against lowest, as was done in Sterling's example. Sterling's entire discussion revolves around this unwarranted assumption. Contrary to Sterling's claim, it is entirely justifiable to pool data from several months and apply the critical ratio test to the pooled

data, as there is no evidence that the data pooled are heterogeneous.

An additional point should be mentioned, however, since Sterling was obviously trying to simulate our experiment in his discussion. We did not select 12 samples of 34 each, but 12 samples of approximately 340,000. His suggestion that we should have used the *t* tables (footnote, page 957) ignores the elementary statistical fact that for very large Ns the binomial approximates the normal distribution.

As an example of how irrelevant this seasonal comparison is, a recent analysis of some data on schizophrenia can be cited. We have found that there is apparently no significant interseasonal variation in rates of hospitalized schizophrenia by month of birth in Central Ohio (contrary to the findings of other similar studies). However, we do find a highly significant association with the temperature during the summer preceding the birth of the schizophrenic similar to our finding in mental deficiency. It might be of interest to report also that since the publication of the original article we have accumulated a sizable body of additional data which tends to support our temperature hypothesis.

A major matter requiring discussion is the statement about "adjusting" the incidence of feeble-minded births made on page 959. We are disturbed that it should be necessary to define incidence and to point out that it is calculated by determining the proportion of cases with the condition under consideration found in the total population at risk. This is everyday public health practice and takes into account both numerators (the number of retarded births) and denominators (the total number of births), as well as the variation in lengths of the months, which is a factor in this case. Sterling's suggestions about three reasons for variation indicate a serious misunderstanding of the meaning of the term incidence. We are dealing with rates and not with variables on a continuous scale, that is, with enumeration data in which discrete classification of individuals on the basis of the presence or absence of an attribute is made. The critical ratio is a perfectly appropriate statistic for testing the significance of a difference between two proportions.

This failure by Sterling to use denominators is repeated throughout the criticism in citing observations from Cincinnati which purport to show that our data are "influenced by sampling error" (page 956) and are not supported by findings in some other samples. He presents, for instance (page 961), the distribution of the month of birth for 84 cases with mental retardation in a clinic and for 15 cases in the first grade of a private school without any reference whatsoever to the number of births each month in the population from which these cases were drawn. He did have at hand other data pertinent to these points, since we referred in our article to three publications[3-5] by the professor of experimental medicine at his own institution which showed findings similar to ours and which did take into consideration the populations at risk.

Sterling makes the same fundamental error in the discussion of illegitimate births (page 962). What percentage of illegitimate or mentally deficient births occurs in February, or in any other month, is totally irrelevant without relating it in terms of a rate to the total number of births for the month. Even if the nonparametric rank correlation coefficient of +0.454 between the percentage distributions by month of the 701 illegitimate and 5,855 mentally deficient births that Sterling derives (page 962) were statistically significant (and it is not with an N of 12), it would be meaningless because it is cal-

culated only on numerators drawn from two different populations. That a comparison of these illegitimate births with 84 cases of mental deficiency does not yield any significant correlation is certainly not surprising in view of the small numbers involved.

A number of obvious sources of sampling bias which might have arisen in earlier studies, as well as in our own, had we gone no further than the previous investigators of seasonal variation, are mentioned by the critic. These have to do with admission policies (page 961), illegitimacy (page 962), socioeconomic differences in mating patterns (page 961) and so on. It would be difficult to conceive how any selection for either admission or illegitimacy could result because six or more years previously a mental defective's third fetal month occurred during a hot summer or because the specific spring in which a girl elected to become illegitimately pregnant was followed by a summer with high temperatures. In the same fashion, one would not expect mating patterns in the spring to be altered by the temperature of the following summer. The reader, however, might be interested to learn that an investigation we conducted of class variations in month and season of marriage in Franklin County, Ohio, from 1933 to 1958 indicated that there were no seasonal differences in marriage rates by social class. We also commented in our paper (page 1204), and published the detailed data elsewhere,[6] that socioeconomic seasonal variations in births apparently could not account for our findings. We hasten to indicate that this latter point is also irrelevant so far as the temperature hypothesis is concerned.

There are a number of other points which should be mentioned. For instance, although it was neither necessary nor germane to the main thesis of our paper, we called the Vital Statistics Division of the State Health Department, from which the original data on the total births in 1913 through 1948 were obtained, to verify again the fact that they are recorded by the month in which the birth occurred and that, in Ohio at least, it is not "common practice for birth statistics to be computed by the number of certificates filed each month and not by the dates on these certificates" as Sterling states (page 960).

In regard to the question of the prevalence of infections at different seasons (page 964), it is necessary only to refer Sterling to the National Health Survey statistics, which indicate unequivocally that the incidence of acute conditions, 65 per cent of which are predominantly viral respiratory diseases, is highest in cold weather.[7] The references he cites as contradicting this general finding concern themselves either with conditions that are of low total incidence or with diseases in closed populations.

Sterling states (page 964) that we base our hypothesized implication of protein deficiency on a "postulated" decrease in food intake during hot months. This is not "postulated", and we need merely refer to a publication of the Department of Agriculture which indicates not only that the total calories ingested decrease in the summer but that the amount of protein ingested decreases also.[8] Sterling makes a statement that the amount of protein necessary to sustain the life of an adult is "small." Small, of course, is a relative word. However, we are not writing about sustaining the life of an adult but are referring to the effect of the diet of a pregnant woman upon the chemical environment of the new life she is producing. It is not completely irrelevant to the subject matter under discussion to mention that we should want more for everyone than just the mere sustaining of life and that we are

interested in eliminating as many handicapping conditions as possible, including mental deficiency. Although it is true that proteins can be assembled in the body, it should not be necessary to have to point out in this Journal that it is not possible to synthesize proteins from carbohydrates and fats, which do not contain any nitrogen, but eventually only from ingested proteins. Furthermore, protein is not present in adequate amount or quality in all foods. The possibility of specific essential amino acid deficiencies as a consequence of decreased protein intake and failure to consume foods with adequate diversification of these essential amino acids must be considered. Dietary inadequacy was offered by us, after some consideration, as the most profitable area for further investigation. However, we advanced other possible mechanisms (pages 1206-1207) associated with season such as salt depletion, complications of pregnancy, viral infections, thiamin deficiency (page 1204), and still more, both singly and in combination, in other papers.[9,10]

During the course of his argument Sterling, by again ignoring the main thesis, states (page 960) that the effects of season are trivial. A variable which may increase the risk of such a common condition as mental deficiency in two months of the year by 30 per cent cannot be considered trivial. This additional risk is many times larger than that of developing phenylpyruvic oligophrenia, a condition on which an enormous amount of effort has recently been concentrated. Parenthetically, his calculations are incorrect, but even if the effects were small they would remain important from the point of view of leads to other etiologic factors and as signposts to possible areas of prevention.

We would like to return briefly to Sterling's criticism (page 963) of editors for failing to publish negative results and relate his statements in this regard to data he gives in this present critique. He offers 84 patients examined in a clinic for mentally retarded in Cincinnati, representing an average of four births per year for a 20-year period, as evidence that "sampling among retarded in Cincinnati failed to verify the author's findings" (page 964). If these are the kind of negative results that are submitted to editors for publication, it is not surprising that they are rejected.

Over the years in many studies we must admit to committing a fair share of errors, most of which we hope were caught before publication. However, it would seem that Sterling has not been able to show us, or others, the error of our ways. He is apparently unable to profit from his own statements, since he repeatedly makes the very same mistakes of which he accuses us.

In summary then, our original paper can be divided into three parts: The first described our confirmation of the findings of others that winter-born babies have a higher risk of being defective. This observation is no longer in the realm of hypothesis, having been described repeatedly in the last few decades, and it deserved neither independent publication nor critical discussion. The second and unique portion was our description of the construction and testing of the hypothesis that higher summer temperatures are related to this increased risk. This part Dr. Sterling does not discuss. The third part was a discussion of possible mechanisms and the implications of the findings for additional research and public health action. This he does not understand.

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Quality the Answer to Insufficient Quantity

"The provision of sanitation training for individuals engaged in activities and trades subject to health department supervision can do much to free staff personnel for more pressing sanitation problems. . . . In addition, broader education of the public concerning the functions of sanitation personnel can do much to conserve needed manpower. Many sanitarians have their hands full answering trivial complaints and tracking down vague allegations.

"Public health must find ways to gear its administrative practices to its manpower reservoir. . . . Administrators of sanitation programs should take a hard look at the way things are being run. Changing administrative methods, rearranging office space, and relocating personnel may contribute materially to the total efficiency of the program. . . . We will never have enough sanitation personnel; therefore, we must augment the quality of sanitation control and the span that can be covered by each worker to make up for what we lack in numbers."

(Mack I. Shanholtz, M.D., Guest Editorial. Health Officers News Digest, July-August, 1960.)

This paper describes a study to evaluate the use of fluorescent tagged antibody in the diagnosis of rabies. The authors believe that the FRA test is a valuable addition for the rabies diagnostician, but they also indicate some limitations of the technic.

RABIES DIAGNOSIS BY FLUORESCENT ANTIBODY

I—ITS EVALUATION IN A PUBLIC HEALTH LABORATORY

James L. McQueen, D.V.M.; Arthur L. Lewis, D.V.M., M.P.H.; and Nathan J. Schneider, Ph.D., M.P.H.

In 1958, Goldwasser and Kissling reported[1] that fluorescent antibody technics could be used to stain street and fixed rabies viral antigens in the brain tissue of experimentally infected mice. They also indicated that this technic might prove useful for the identification of rabies antigens in the brains of animals which were Negri negative. On the basis of this study and more recent work by Goldwasser and Kissling, et al.,[3] the Florida State Board of Health undertook to evaluate fluorescent antibody technics as applied to the routine laboratory diagnosis of rabies. The following report represents the results of routine examination of specimens received at the central laboratory during a 13-month period.

Design of the Study

In the study, Sellers' stained smears prepared from all fresh or frozen brains submitted to the laboratory were examined microscopically for Negri bodies. Smears were also examined for the presence of rabies virus or viral antigen by the Fluorescent Rabies Antibody* (FRA) test. Standard mouse inoculation tests were performed on all specimens and, for the purposes of the study, were considered as the definitive criterion of the presence or absence of infection.

To assure objectivity in observation, it was planned that all specimens for FRA examination be run as unknowns. However, the nature of the senior author's responsibilities made it necessary for him to be informed of the Negri body findings in some 10 per cent of the cases. Since the specimens for FRA testing were processed once weekly, and only then in lots of 20 or more, the individual specimens by that time were actually all unknowns. In only one instance, a human rabies case, was the result of the mouse inoculation test known before the FRA test was completed. For reasons which will be explained later, specimens received at the central laboratory preserved in a glycerol-saline medium were handled differently than those received in a fresh or frozen state.

Materials and Methods

Source of Reagents

Antibodies for labeling were crude globulin solutions prepared from hyperimmune antirabies sera of equine origin

* Hereafter referred to in text as FRA test.

(Lederle).* Fluorescein isothiocyanate,[5] secured from two commercial outlets (Baltimore Biological Laboratories and Sylvana Chemical Company),† was used as the labeling material in the production of conjugates. Acetone-dried brain and liver powders for conjugate adsorption and mouse-brain tissue suspensions for use in the control system were prepared in the laboratory according to procedures described elsewhere.[2,3]

Microscopic Equipment

A Reichert† "Fluorex" unit employing an Osram HBO 200 mercury vapor lamp and a Corning 5840 (half-stock thickness) filter served as the light source. A standard monocular Reichert microscope was fitted with a cardioid darkfield condenser. The objectives, complete with funnel stops when needed, were a 10X, 45X, and 97X oil immersion. The 10X ocular was fitted with a Wratten 2-B gelatin filter.

Labeling of Antisera

The globulin solution, containing specific rabies antibody, was diluted to a protein concentration of 2.5 gm per cent in 0.01M KH_2PO_4/K_2HPO_4-buffered saline (p.h. 7.4-7.6) to which was added 0.5M.$Na_2CO_3/NaHCO_3$ buffer to form 10 per cent of the final volume. To this mixture, powdered fluorescein isothiocyanate was slowly added in a ratio of 1 mg fluorescein to 20 mg protein. The mixture was then subjected to overnight mechanical stirring in the cold, followed by dialysis against repeated changes of phosphate-buffered saline until no traces of fluorescein could be detected in the dialyzing fluid when examined under ultraviolet illumination.[3,2,4] In order to remove nonspecific staining properties, the conjugated protein solution, i.e., the tagged antibodies, was further diluted to 1 gm per cent protein and adsorbed with liver and brain tissue powders.[2,4] After tissue adsorption, final dilution with veronal-buffered saline to which had been added bovine-serum albumin served to reduce nonspecific staining reactions as well as to extend the final volume of staining material.

Proof of Conjugate Specificity and Control Systems

After tissue adsorption, the finished conjugates were tested against known positive and negative specimens. Conjugates which did not produce discrete bright staining or viral antigen in known positive specimens, or conjugates from which the nonspecific staining properties were not almost totally eliminated, were discarded as unsatisfactory for use. Moreover, as each conjugate was produced and before it was used in the test system, proof of specificity was sought in several ways. These included: (1) the failure to stain normal brain tissue or brain tissues in which inclusions of diseases other than rabies were demonstrable; (2) the inhibition or partial inhibition of staining by pretreatment of a positive smear with unconjugated antirabies serum; and, finally (3) the complete inhibition of staining by the addition of rabies infected mouse-brain suspension to the conjugate.[4]

This exposure of conjugate (labeled antibody) to rabies-infected tissue (homologous antigen) not only served as proof of the specificity of any given lot of conjugate, but was also used as a control on each unknown specimen. As described by Goldwasser, et al.,[3] a 20 per cent tissue suspension of normal mouse brain (NMB) was prepared. A similar suspension of infected mouse brain (IMB) was made from mice infected intracerebrally with a strain of fixed rabies virus. Five to ten minutes prior to staining smears, aliquots of conjugate were mixed, respectively, with

* Acknowledgment of companies or trade names does not constitute endorsement of equipment or products.

equal parts of normal mouse-brain suspension and with rabies-infected mouse-brain suspension. The mixing of conjugate with rabies-infected tissue suspension completely inhibited the staining of known positive specimens. In contrast, the similar use of normal mouse brain did not produce inhibition of staining.[4,3,1] Thus, when these two solutions were applied to the separate test and control smears of an unknown, a practical, one-step control system was effected. That is, if the unknown was in fact positive, one would expect to note greenish fluorescent particles in the test smear treated with conjugate-normal mouse brain, whereas the control smear treated with conjugate-infected mouse brain should show no fluorescence if the reaction is specific. It is apparent, then, that identical reactions occurring in both test and control were regarded as nonspecific and that, ideally, greenish fluorescent particles should be absent from both the test and control smears of a negative specimen.

Treatment and Processing of Specimens

On receipt of the brain specimens in the laboratory, four slides were prepared for Negri-body examination according to accepted procedures. Representative portions of the brain tissues were then preserved in glycerine for subsequent mouse inoculation. In addition, portions of Ammon's horns and cerebral cortex were placed in dry specimen bottles and held for FRA examination. Occasionally, slides were made immediately for FRA testing; however, it was found more practical to store the specimens either chilled or frozen and to process them weekly. Periodically, specimens for FRA examination were removed from the refrigerator or freezer and allowed to stand briefly at room temperature. Portions of the tissues were removed from each bottle and two very thin impression smears were made on each of four slides. The smears were allowed to air-dry for 30 minutes and then fixed by a four-hour immersion in acetone held at minus 20° C. After that, the racks were removed from the acetone and the smears were thoroughly dried while remaining in the freezer. The slides could then be stained and examined immediately or stored at minus 20° C for several days without impairing staining quality.[3]

Staining of Smears

The direct staining procedure of Coons and Kaplan,[4] as modified by Goldwasser, et al.,[3] was used. Two slides of each specimen were removed from the freezer and the condensed moisture was allowed to evaporate. The two separate smears which had been made on each slide were ringed with a Vaseline-ether solution to prevent mixing of the conjugate. Approximately 0.02-0.04 ml of the conjugate diluted 1:2 with normal mouse brain was applied to the right, or test, smear. An equal amount of the same conjugate mixed in the same proportion with infected mouse brain was applied to the left, or control, smear. Following application of the conjugate-tissue suspensions, the slides were incubated in a moist chamber at 37° C for 30 minutes, after which time the slides were washed ten minutes in two changes of phosphate-buffered saline to remove excess tagged antibody. The slides were taken from the wash, excess moisture was removed, and a drop of buffered glycerol-saline mounting fluid and a cover slip were added.

Reading of Smears

For controls, each group of unknowns was accompanied by a known positive and negative slide. As a check on conjugate specificity, the known negative was read first. To ascertain the sensitivity of the system, the known positive was then examined. As stated previously, with the system working cor-

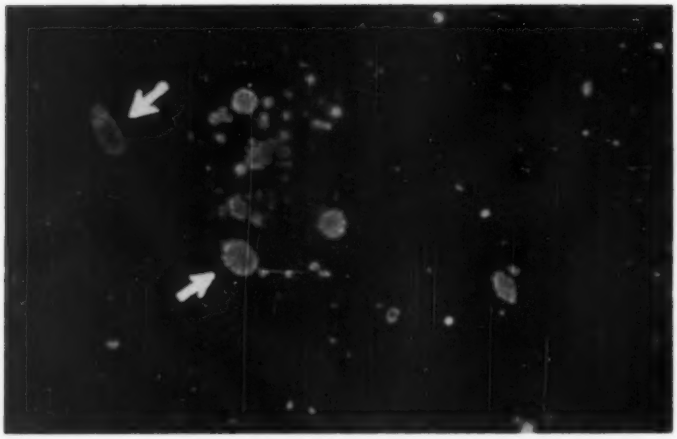

Figure 1—Impression Smear from Brain of Naturally Infected Dog

The fluorescent particles, ranging in size from 0.2 microns to 10 microns, represent aggregates of rabies virus and/or viral antigen. The larger fluorescent particles (arrows) correspond in size to Negri bodies. Magnification X970.

rectly no fluorescence was noted in the negative specimen. In contrast, the known positive test smear (treated with conjugate-normal mouse brain) showed varying numbers of bright green fluorescent bodies ranging in size from the barely visible to those over 20 microns in diameter, whereas, the positive control smear (treated with conjugate-infected mouse brain) exhibited only the blue to greenish-grey autofluorescence of unstained or normal tissue. In reading the unknowns, the test smear was examined first and in the absence of greenish particulate fluorescence the control smear was not consulted. When greenish fluorescent particles were observed in an unknown test smear, they were examined more closely under oil immersion. The control smear of this specimen was then read and any reactions occurring on both sides of the histochemical equation were considered nonspecific.

The aggregates or accumulations of viral antigen, as observed in field specimens, assumed many shapes and sizes. As reported by Goldwasser and Kissling,[1] with few exceptions the larger fluorescent bodies were closely correlated with the size, shape, and distribution of Negri bodies seen on companion smears made from the same specimen and treated with Sellers' stain (Figure 1). It should be emphasized, however, that in every positive specimen the authors observed uncountable numbers of antigen aggregates which were unidentifiable by Sellers' staining, and that even in the absence of the larger fluorescent aggregates, a diagnosis could be rendered on the defined specificity of these smaller fluorescent particles. Such, in fact, was the case with the Negri-negative, virus-positive specimens processed. Although fluorescent structures within the size range of normal Negri bodies were seen on some of these Negri-negative specimens, for the most part the fluorescent particles were less

in number and smaller in size than commonly seen on the typical Negri-positive (Figures 2 and 3).

The phenomenon most frequently observed on positive specimens was the appearance of round fluorescent bodies of varying diameter exhibiting bright peripheral fluorescence with central darkening or mottling. These morphologically distinct "ring-forms" were observed in every positive specimen, occurring with such a high degree of regularity that they were virtually diagnostic (Figure 4).

The nature of nonspecific staining reactions is poorly understood and less well defined. These reactions, occurring even with a highly refined conjugate, might be classified as: (1) granular precipitation of stain, (2) diffuse staining of the tissue, occurring particularly in thick areas of tissue impression smears, and (3) cellular staining of normal tissue components. A conjugate, to be acceptable, must not stain normal tissue cells, and for the most part this undesirable property may be almost totally eliminated by tissue powder adsorption and conjugate dilution. Although the staining reactions caused by the other two factors are usually morphologically distinct and easily differentiated from a specific reaction, it remains the primary function of an adequate control system to identify these nonspecific reactions when they occur.

One should not confuse specific or so-called nonspecific staining reactions with normal tissue fluorescence. Normal tissue fluorescence may be thought of as: a diffuse type of tissue autofluorescence and as normal particulate fluorescence. When smears are properly made and processed, and when proper optical equipment is used for reading the slides, the tissue background will appear dark blue-grey to slightly greenish-grey. Quite often, however, the tissue background will fluoresce intensively, appearing bright blue-grey to white, particularly if the smears are very thick or if the tissue has been stored frozen

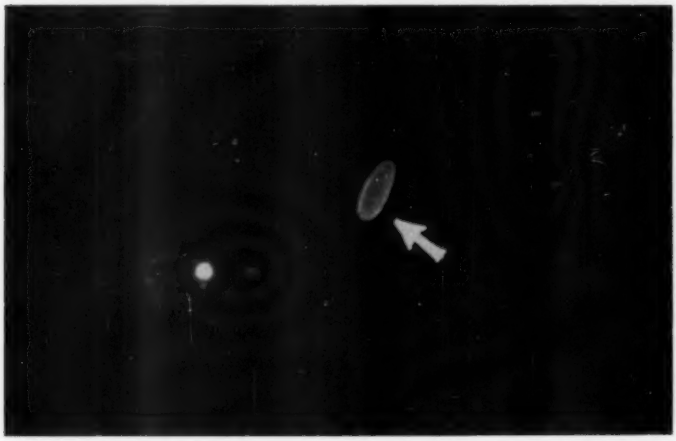

Figure 2—Impression Smear from Brain of Naturally Infected Horse

Arrow points to one large (approximately 6 x 15 microns) antigen aggregate. Although the specimen was Negri negative, several greenish fluorescent bodies within the size range of Negri bodies were seen on FRA examination. Magnification X970.

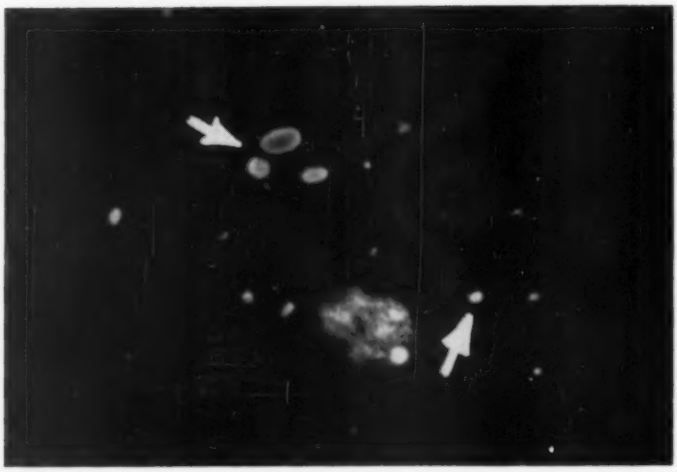

Figure 3—Impression Smear from Brain of Naturally Infected Dog Exhibiting Symptoms of Dumb Rabies

Particles of fluorescent stained antigen (arrows) ranging in size from 1 to 8 microns are much in evidence despite the fact this specimen was Negri negative. Magnification X970.

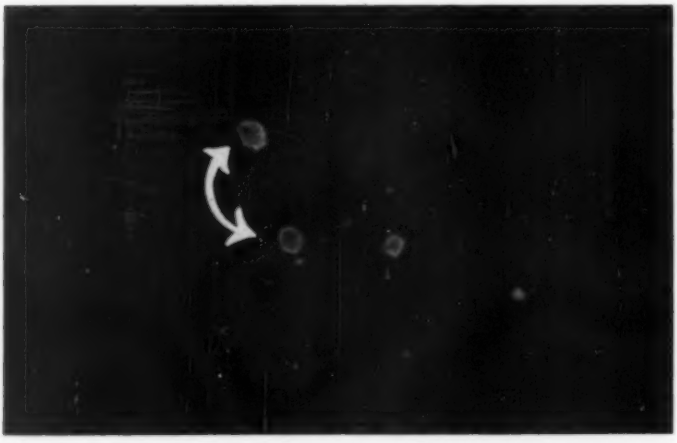

Figure 4—Impression Smear from Brain of Naturally Infected Fox

Arrows point to the "ring-form" of stained antigen aggregates. These round, or nearly round, bodies with bright peripheral fluorescence and central darkening may also be seen on Figures 1 and 3. Magnification X970.

for more than from four to eight weeks before processing. Since the color and intensity of the background fluorescence may be greatly altered by the characteristics of the transmitted light, a filter system for rabies work should be chosen with care. The field (primary) filter should transmit light in the near ultraviolet range, i.e., between 350-400 μ. The eyepiece (secondary) filter should be nearly colorless yet opaque to ultraviolet. Primary filters permitting the transmission of blue-violet light (between 400-450 μ) are to be strictly avoided. Brightly fluorescing yellow, yellow-tan, brown, pink, or white particles may be observed in almost any specimen. This normal particulate fluorescence should be disregarded and not confused with the distinct green fluorescence of attached labeled antibody. It should be obvious, that with the procedures described, it takes a minimum of from seven to eight hours to process any one specimen.

Results and Analysis of Data

Data on each specimen (species; method of preservation; Negri examination results; FRA reading; control system used; results of mouse inoculation; and remarks) were recorded on a specially prepared work sheet. Results of the Negri body examination and mouse test were recorded only after the FRA test was reported as either positive or negative. In reading the slides the accumulated total of FRA positive slides was posted over the total number of slides run on each specimen, e.g., $N^0/2$-or-$P^2/2$.

As seen from Table 1, a total of 825 fresh or frozen specimens was processed. The FRA technic was in complete agreement with mouse inoculations on the total number processed, detecting 70 of 70 positives. No false positive reactions by FRA were recorded. Results of the Negri examination agreed only 98.3 per cent with mouse inoculations. This margin of error was comprised of four specimens which were Negri-negative, virus-positive (Table 1, column 3) and ten specimens which were called Negri-positive but from which no virus could be isolated (Table 2). Review of the Sellers' stained slides of the Negri-positive, virus-negative specimens revealed for the most part only atypical inclusions. In three of these specimens, however, inclusions characteristic of Negri bodies were seen. The FRA examination on these ten brain specimens was negative. In addition, no virus could be isolated from four of this group on which salivary gland tissues were available for examination.

Table 1—Fluorescent Rabies Antibody (Fresh or Frozen Specimens)

1	2	3 Specimens Positive		
Species	Specimens Examined	Negri Exam.	Mouse Inoc.	FRA
Dog	244	33	35	35
Fox	45	10	10	10
Cat	204	3	3	3
Raccoon	54	7	7	7
Squirrel	63			
Skunk	7	3	4	4
Opossum	27			
Bat	79	5	5	5
Bovine	4	3	3	3
Goat	2			
Monkey	4			
Hog	0			
Bobcat	2	1	1	1
Hamster	12			
Rat	58			
Gopher	1			
Mouse	3			
Rabbit	11			
Horse	2	0	1	1
Human	1	1	1	1
Other	2			
Total	825	66	70	70

Table 2—Fluorescent Rabies Antibody (Fresh or Frozen Specimens)

Species	Specimen Number	Test Results: Negri Exam.	FRA	Mouse Inoc.*
Dog	239	+	—	—
Dog	743	+	—	—
Fox	124	+	—	—
Fox	125	+	—	—
Fox	202	+	—	—
Fox	487	+	—	—
Fox	411	+	—	—
Cat	378	+	—	—
Bat	701	+	—	—
Raccoon	380	+	—	—

NOTE: Review of the Sellers stained slides on these specimens revealed for the most part only atypical inclusion bodies. However, on specimens No. 378, 701, and 743 the inclusions were typical of Negri bodies.

* All mice were held for a minimum of 30 days and in five cases blind mouse passage was done in an attempt to isolate virus.
+ = Evidence of virus or Negri bodies.
— = No evidence of virus or viral antigen.

Discussion

Difficulties Encountered and Test Limitations

One of the most distressing hindrances to the routine use of the procedure at this time is the unavailability of commercially produced reagents. Although several good fluorochromes are available commercially, there is at present no dependable commercial source of labeled antiserum. Moreover, it is in the production of a satisfactory conjugate that the major obstacle to successful performance of the test is encountered. It is impossible to predict whether one will secure a suitable conjugate from the combination of any given lot of antiserum and reagent dye. It now appears that both factors may be variable. The authors have succeeded in producing satisfactory conjugates five out of seven times, using six different lots of antisera and four different lots of fluorescein isothiocyanate obtained from two sources. It was apparent that some lots of dye gave better conjugation of the protein than did others.

It should be stressed that the success obtained with the technic may depend to a large extent on the conscientious application of certain prescribed procedures in the preparation of fluorescent conjugates and in the performance of the test. Persons beginning work with the FRA test should gain first-hand experience in the preparation of reagents. It would also appear advisable, before attempting the test on unknowns, to use a conjugate of proven specificity and work with known positive and negative specimens to gain a great deal of experience in reading slides.

During the initial phase of this study, it was noted that when specimens had been preserved in glycerol-saline, it seemed impossible to obtain the quality of staining observed in fresh or frozen specimens. After a glycerinated brain specimen was called negative by FRA test and proven positive by mouse inoculation, it was undertaken to study this problem more thoroughly. A study was done on 53 glycerinated specimens obtained from naturally infected animals of which eight were positive by mouse inoculation. Of the eight positives, four were Negri-negative. The FRA test failed to detect the presence of viral antigen in the glycerinated specimens from one Negri-negative and one Negri-positive animal. Thus, the FRA technic detected only 75 per cent of the eight glycerinated positives. This is to be compared to the complete agreement obtained between the FRA and mouse inoculation tests on 70 positive specimens processed as fresh or frozen. In addition, controlled experiments on the brains of many experimentally infected mice indicated, to the satisfaction of the authors, that specimens preserved in glycerine were completely unsatisfactory for FRA examination. It was demonstrated conclusively that glycerination even for short periods resulted in almost every case in a material and often a diagnostically critical quantitative and

qualitative decrease in visible fluorescence.

Summary

The procedure for staining rabies virus antigens with fluorescent tagged antibody in the brains of naturally infected animals is described, and is represented schematically in Figure 5. The usefulness of this technic for the routine diagnosis of rabies in the public health laboratory, particularly in the case of Negri-negative animals, is emphasized. It has been demonstrated that FRA test may be used to advantage to help define the antigenic nature of atypical or otherwise questionable inclusion bodies observed during direct microscopic examination. It is believed that the FRA test, as it stands today, is a valuable adjunct to the armamentarium of the rabies diagnostician.

The FRA test was in complete agreement with the mouse inoculation results on a total of 825 fresh or frozen specimens, whereas the results of the Negri examinations gave only a 98.3 per cent correlation. The FRA test detected all of the 70 positives included in the

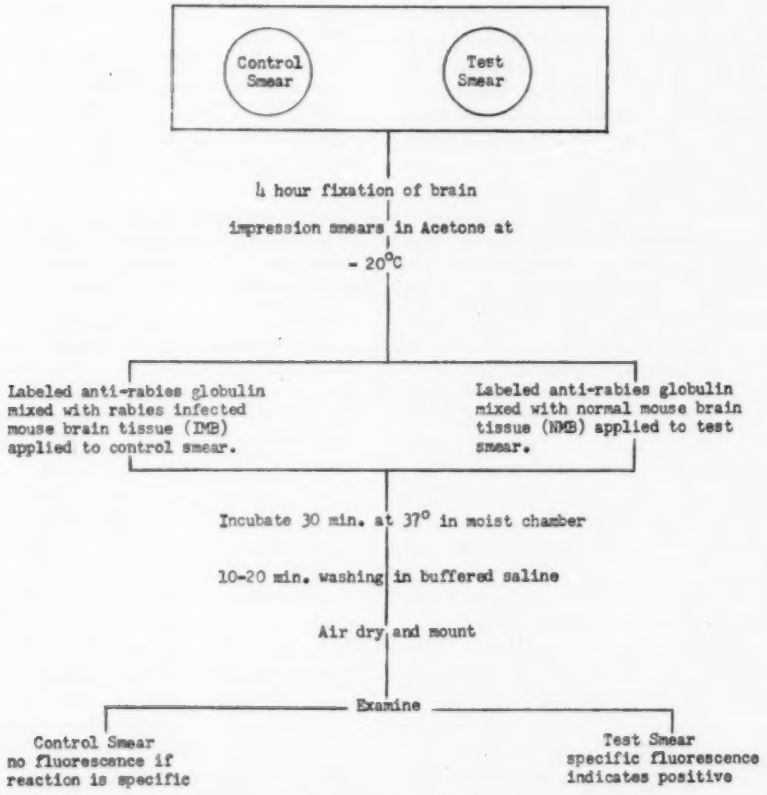
Control Smear
Test Smear
4 hour fixation of brain impression smears in Acetone at - 20°C
Labeled anti-rabies globulin mixed with rabies infected mouse brain tissue (IMB) applied to control smear.
Labeled anti-rabies globulin mixed with normal mouse brain tissue (NMB) applied to test smear.
Incubate 30 min. at 37° in moist chamber
10-20 min. washing in buffered saline
Air dry and mount
Examine
Control Smear no fluorescence if reaction is specific
Test Smear specific fluorescence indicates positive

Figure 5—Fluorescent Rabies Antibody Test (Direct Method)

group. In contrast, in only 66 of 70 positives or 94.3 per cent were Negri bodies demonstrable.

Results would indicate that fragments of brain tissue preserved in glycerol-saline are not satisfactory for FRA examination. The factor, or factors, which interferes with the antigen-antibody reaction or "staining" of viral antigen in these specimens is not understood.

Preliminary studies indicate the FRA test to be highly specific. It appears to be more sensitive than the direct microscopic examination of Sellers' stained slides; however, additional studies are needed before any firm conclusions can be drawn on the sensitivity of the FRA test as compared to standard mouse-inoculation technics. It is hoped that, with the application of the FRA test in other laboratories, it will soon be possible to ascertain more precisely the relative merits and limitations of this technic.

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What are the optimum survey procedures for supplementing regular mortality statistics? This report presents some results of methodological studies which have been undertaken to develop procedures for querying sources of information identified on death certificates. The survey procedures are evaluated primarily in terms of response rates.

SURVEY PROCEDURES FOR SUPPLEMENTING MORTALITY STATISTICS

Monroe G. Sirken, Ph.D., F.A.P.H.A.; James W. Pifer; and Morton L. Brown

DURING recent years, there have been substantial increases in the uses of vital records for research at the local, state, and national levels. Vital records are often used in retrospective or follow-back studies where the record serves as a focal point in sample surveys for collecting supplementary vital statistics. In these studies, a sample of records is selected from a frame of registered events and the information available from the records is supplemented by information collected by surveys. The supplementary data are usually collected from one or more sources of information identified on the vital record itself.

In the course of conducting several follow-back studies to collect supplementary mortality statistics during the past two or three years, the National Office of Vital Statistics (U. S. Department of Health, Education, and Welfare, PHS) has experimented with survey procedures for conducting these studies.[1] Some results pertaining to survey procedures and response rates are summarized in this report.

The form and content of the official death records in use in the continental United States are determined by the 53 registration areas and therefore vary in certain details. However, these records conform in most essential respects to the standard certificate recommended by the U. S. Public Health Service. The standard death certificate identifies selected persons and institutions which can be utilized as sources of information in follow-back studies. These sources are (1) the funeral director, (2) the physician who certifies the death, (3) the informant who supplies personal particulars about the deceased person for the death record, and (4) the institution in which death occurred.

The results presented in this report are based primarily on two follow-back studies anchored to death records. Response rates and related information pertaining to the physician, informant, and funeral director as sources of information are derived from the Pennsylvania Mortality Study. Information pertaining to the institution of death is based on the Illness Study of Deceased Persons.

The Pennsylvania Mortality Study was undertaken collaboratively by the National Office of Vital Statistics and

the National Cancer Institute of the U. S. Public Health Service in cooperation with the Pennsylvania State Department of Health.[2] It was primarily a methodological study to develop technics for collecting supplementary mortality statistics from physicians and informants by survey methods. It also served as a pilot study for an epidemiological investigation involving air pollution, the use of tobacco, and exposures in selected occupations in relation to deaths from lung cancer and other selected diseases. The sample contained about 1,700 deaths selected from those registered in the state of Pennsylvania during the three-months, August-October, 1956. It was designed to give adequate coverage of the principal causes of death by age, sex, and race. Information collected from physicians included the diagnostic procedures on which the causes of death were based.[3] Information about the smoking habits, residence history, and the job history of the deceased persons was collected from informants. The funeral director was queried to identify the certifying physician or the informant (or substitute person) in the event that these sources could not be identified from the death certificate.

The Illness Study of Deceased Persons was undertaken by the National Office of Vital Statistics for the National Health Survey Program. It was a pilot investigation of methodological and other problems involved in obtaining data on the hospital and medical services received by decedents during the 12-month period prior to death. A representative sample of about 700 deaths (one-fortieth of the deaths occurring in the Middle Atlantic States during April, 1957) was selected for the study. Information about hospital care and services rendered to the deceased person was collected from the institution of death and from other hospitals in which it was ascertained that the deceased had received care.

Procedures for collecting data from sources identified on the death certificate were initiated with a mail survey. Follow-up actions by mail and if necessary by other means were undertaken with nonrespondents. Response rates to initial mailing and subsequent follow-up actions will be reported separately for each of the sources of information in the four sections which follow. There will be frequent reference to the response rate after the first mail survey and to the cumulative response rates after the mail follow-up and after all other follow-up actions. For convenience, the following definitions have been adopted:

1. Initial response rate—response rate to the original mail survey;
2. Final mail response rate—response rate after completion of the "follow-up mail" actions;
3. Total response rate—response rate after completion of "all follow-up" actions.

Unless otherwise indicated, the response rates give the percentage of questionnaries returned without regard to the extent of their completion.

Funeral Director Response Rates

The funeral director was asked to identify an informant (1) whenever the name and/or address of the informant was unavailable or could not be read from the death certificate, or (2) whenever a letter was returned because it was undeliverable by the post office. The funeral director was queried for all cases in which the death certificate was signed by a hospital record librarian. A request for the identification of a physician was made only occasionally because the Pennsylvania Department of Health assisted in identifying physicians on the death certificate. In addition, the American Medical Directory was searched before a referral was made to this organization.

Three mailing actions were used in the Pennsylvania Mortality Study to elicit responses from funeral directors. The first query was sent by regular mail. If a reply was not received within ten days, a regular mail follow-up was sent. A second follow-up to nonresponding funeral directors was mailed ten days later using certified mail.

The total number of funeral directors queried in the Pennsylvania Mortality Study was 328, about 19 per cent of the sample of 1,731. The final mail response rate of 99 per cent for funeral directors was obtained by the steps shown in Table 1.

Two conclusions are evident regarding response from funeral directors: (1) The total response rate was nearly 100 per cent, and (2) initial response accounted for a large proportion of the total response. The latter fact has important implications in terms of cost. It should also be noted that identification of a source was obtained in 92 per cent of the queried cases. A query was returned without identification in 6 per cent of the cases and in 2 per cent the funeral director did not supply the requested information.

Table 1—Response Rates for Funeral Directors by the Action which Elicited the Response: Pennsylvania Mortality Study

Action Eliciting Response	Per cent	Cumulative Per cent
Nonresponse	1	
Response	99	
Original mail query	78	78
Regular mail follow-up	16	94
Certified mail follow-up	5	99

Sample size: 328

Physician Response Rates

The mailing actions for physicians were similar to those used with funeral directors. In order to test the effect of two alternative follow-up actions on nonresponding physicians, however, different series of mailing procedures were used for two randomly selected groups of physicians. Physicians in the first group received a regular mail query first. If a reply was not received within 12 days, a certified mail follow-up was sent. If a query had not been returned at the end of 24 days from the time the original form was mailed, the case was turned over to either the Bureau of the Census or the Western Union Telegraph Company for a telephone reminder.* In the second group, three follow-up actions were used to elicit responses from nonresponding physicians: a regular mail follow-up, a certified mail follow-up, and a telephone reminder interview.

Physician response rates are summarized in Table 2 where they are distributed according to the two procedures which were tested for conducting follow-up actions on nonrespondents to the original mail query. Although the total response rates for the two procedures hardly differ, there is a significant difference at the 1 per cent level in the final mail response rates between the two procedures. The final mail response rate to the procedure consisting of only one mail follow-up was 92 per cent, as compared with a 96 per cent response rate for the procedure with two follow-up mailing actions. It is noteworthy, however, that the physician response rates to the first follow-up actions

* Representatives of these organizations, working through their branch offices in the state of Pennsylvania, conducted telephone reminder interviews with physicians. In the interview, the physician was requested to return the form to the National Office of Vital Statistics as soon as possible. No attempt was made to obtain diagnostic information from the physician over the telephone.

Table 2—Response Rates for Physicians by Procedures Used to Collect Data and the Action Which Elicited the Response: Pennsylvania Mortality Study

Action Eliciting Response	Procedure 1		Procedure 2	
	Per cent	Cumulative Per cent	Per cent	Cumulative Per cent
Nonresponse	3		2	
Response	97		98	
Original mail query	60	60	65	65
Regular mail follow-up	*	*	21	86
Certified mail follow-up	32	92	10	96
Telephone reminder	5	97	2	98
Sample Size:	872		859	

* Follow-up action was not attempted.

were augmented as a result of sending queries by certified mail rather than by regular mail. The response rate was 92 per cent for physicians receiving a certified mail follow-up and 86 per cent for those for whom the first follow-up action had been by regular mail.

Response rates were also investigated in terms of characteristics of physicians. In Table 3, the initial and total response rates are shown for four variables: age of physician, population size of physician's place of practice, type of certifier, and specialty of physician. The total response rates were not significantly different at the 5 per cent level for any of the characteristics tested. However, the initial response rates were significantly different for three of the four variables: younger doctors responded later than older physicians; regular certifiers responded later than medicolegal certifiers; and physicians practicing in cities of 50,000 or more population responded later than physicians practicing in other places.

Response from physicians in the Pennsylvania Mortality Study can be summarized as follows: (1) the total response rate was 97 per cent, (2) the higher final mail response rate was elicited by the procedure in which two follow-up actions were employed, a regular mail query and a certified mail query, as compared with a procedure in which a single certified mail follow-up was used, and (3) the total response rate was high regardless of the selected characteristics of physicians which were tested, although there were significant differences in the initial response rates according to the characteristics of physicians.

Informant Response Rates

The Experimental Design

Three experiments were incorporated into the study design of the Pennsylvania Mortality Study in order to test alternative procedures for collecting data about decedents from family informants. The experiments are outlined in Table 4.

Experiment 1 was designed to test the effect of using various combinations of follow-up actions (e.g., regular mail, certified mail, personal interview) for eliciting queries from nonresponding informants residing in standard metropolitan areas. A regular mail query was sent in the initial mailing to all informants; three follow-up procedures

were devised to determine the most effective actions to be taken for those informants who failed to return this query. Procedure 1 consisted of two follow-up mailing actions: a regular mail follow-up and a certified mail follow-up. Fourteen days were allowed to elapse between follow-up mailings. Procedure 1 was used on one-third of the informants. To test response to combinations of regular mail, certified mail and a personal interview, two procedures were designed for the remainder of the informants. Procedure 2 consisted of two follow-up actions after the original query had been sent: a regular mail follow-up and a personal interview. Two follow-up actions were also used for Procedure 3. However, a certified mail follow-up was substituted for the regular mail follow-up.

The purpose of Experiment 2 was to test response to two types of covering letters sent with the initial mail questionnaire. Both letters explained the purpose of the study and instructed the person receiving the questionnaire to complete the form and return it as soon as possible. However, the general tone of one letter, designated as the Firm Covering Letter, was more authoritarian than that of the other, the Permissive Letter. The Firm Covering Letter was written in a matter-of-fact manner, and stated that, "Your health department requests that you complete the form and return it within the next few days. . . ." The permissive version requested that the informant "help us in this study. . . ." A Firm Covering Letter was sent with one-half of the questionnaires mailed during September and a Permissive Covering Letter was sent with the other half. Regardless of the type of covering letter sent with the initial mailing, a letter resembling the Firm Covering Letter was sent with follow-up mailings. Reproductions of the informant letters

Table 3—Comparison of Response Rates by Selected Characteristics of Physicians: Pennsylvania Mortality Study

Characteristic of Physician	Sample Size	Initial Response Rate		Total Response Rate	
		Response Rate	Difference Significant at 5% Level	Response Rate	Difference Significant at 5% Level
1. Age					
Less than 40 years	427	57		96	
40 years or more	976	65	Yes	98	No
Age unknown	328				
2. Population Size of Place of Practice					
Less than 50,000	825	67	Yes	98	No
50,000 or more	906	59		97	
3. Type of Certifier					
Attending certifier	1,594	59	Yes	96	No
Coroner or medical examiner	137	77		99	
4. Speciality of Certifier					
Specialist	225	61	No	97	No
Nonspecialist or speciality not ascertained	1,506	62		97	

Table 4—Design of Survey Experiments to Test Procedures for Collecting Data from Informants: Pennsylvania Mortality Study

Experiment and Purpose	Experimental Procedures	Composition of Experimental Groups
Experiment 1 Purpose: To test the effect of using various combinations of follow-up actions for eliciting queries from nonrespondents	Procedure 1 Regular mail follow-up and certified mail follow-up	One-third of informants living in SMA's*
	Procedure 2 Regular mail follow-up and personal interview	One-third of informants living in SMA's
	Procedure 3 Certified mail follow-up and personal interview	One-third of informants living in SMA's
Experiment 2 Purpose: To test response to a Permissive and a Firm Covering Letter	Permissive Covering Letter	One-half of all death certificates in September sample
	Firm Covering Letter	One-half of all death certificates in September sample
Experiment 3 Purpose: To test response to a long and a short query		
	Smoking Query	One-half of all death certificates for male decedents in October sample
Experiment 3(a): Smoking Query versus Regular Query	Regular Query	One-half of all death certificates for male decedents in October sample
	Regular Query	All death certificates for female decedents in October sample
Experiment 3(b): Residence Query versus Regular Query	Residence Query	One-half of all death certificates in November sample
	Regular Query	One-half of all death certificates in November sample

* SMA (standard metropolitan areas).

used in the Pennsylvania Mortality Study are shown here:

Specimen Letters

Permissive Covering Letter

The Pennsylvania Department of Health is cooperating with the United States Public Health Service in a research program on air pollution and smoking as health hazards. It is important to gather information about the smoking habits and the residence and occupation histories of persons who died recently, and we are asking relatives or close friends to give us this information.

Will you help us in this study which we hope will give results of importance to the future health of your friends and relatives.

The person whose name appears on the first page of the enclosed form is one of many persons who died recently in Pennsylvania selected for this study. Since you supplied the information about the deceased for the death certificate, I hope you will help us in this study by answering the questions on the enclosed form. If you can not answer some of

them, perhaps you can think of someone who can help you do so. When completed, the form should be mailed in the addressed envelope which requires no postage. Your reply will be confidential and will be used for research purposes only.

Your cooperation in supplying these facts would be gratefully appreciated.

Firm Covering Letter

The Pennsylvania Department of Health is cooperating with the United States Public Health Service in a research program on air pollution and smoking as health hazards. Information is needed about the smoking habits and the residence and occupation histories of persons who died recently. Accordingly, we are asking you to answer some questions concerning a person about whom you supplied information for the death certificate.

The person about whom you are being requested to answer questions is one of many persons who died recently in Pennsylvania selected for this study. The name of the person appears on the first page of the enclosed form. Your Health Department requests that you complete the form and return it within the next few days in the addressed envelope which requires no postage. If you can not answer some of the questions, perhaps you can think of someone who can help you do so. Your reply will be confidential and will be used for research purposes only.

Follow-up Letter

Recently, we sent you a letter requesting information about a person whose name appears on the enclosed form. According to our records, we have not yet received your reply. You are therefore requested to complete the enclosed form and return it within the next few days in the addressed envelope which requires no postage.

The Pennsylvania Department of Health is cooperating with the United States Public Health Service in a research program on air pollution and smoking as health hazards. Information is needed about the smoking habits and residence and occupation histories of persons who died recently. The person about whom you are being requested to answer questions is one of several persons included in this study who died recently in Pennsylvania. It is important to get information about each person so that the results of the study will be reliable. If you can not answer some of the questions, perhaps you can think of someone who can help you do so. Your reply will be confidential and will be used for research purposes only.

Experiment 3 compared response to a long questionnaire with response to a shorter version. The long form, designated hereafter as the Regular Query, requested smoking, residence, and occupation information about the decedent. Two short forms were used, one asking for information about the decedent's smoking habits (Smoking Query) and the other requesting information about the deceased person's residence history (Residence Query). The Smoking Query was sent to one-half the informants in the October sample who signed death certificates for male decedents. The remaining informants received the Regular Query. The Residence Query was tested during November, 1956. The queries selected for mailing during that month were randomly divided into two approximately equal groups; one group received a Regular Query and the other a Residence Query.

Analysis of Experiment 1

Informant response rates are distributed in Table 5 by the action which elicited the response and the types of follow-up procedures tested on nonrespondents. The following observations regarding informant response rates may be made:

1. The highest response rates were obtained for procedures which included a personal interview follow-up.
2. The certified mail follow-up augmented the response rates.*

* Response rates to the first follow-up letter were significantly different for Procedure 1 and Procedure 2, although both follow-up letters were sent using regular mail. The reason for this inconsistency is that certified letters were sent to nonrespondents after 14 days had elapsed for cases in which the regular mail follow-up had failed to elicit a response in Procedure 1. In Procedure 2, the nonrespondent cases were sent to the Bureau of the Census for distribution to field enumerators. Therefore, more time elapsed between the first and second follow-up actions for Procedure 2, thus giving these informants more than 14 days to reply to the first mail follow-up.

Table 5—Informant Response Rates by the Procedures Used to Collect Data and the Action which Elicited the Response: Pennsylvania Mortality Study

Action Eliciting Response	Procedure 1		Procedure 2		Procedure 3	
	Per cent	Cumulative Per cent	Per cent	Cumulative Per cent	Per cent	Cumulative Per cent
Nonresponse	10		3		3	
Response	90		97		97	
Original mail query	40	40	45	45	44	44
Regular mail follow-up	28	68	38	83	*	*
Certified mail follow-up	22	90	*	*	45	89
Personal interview	*	*	14	97	8	97
Sample size:	480		483		473	

* Follow-up action was not attempted.

3. The final mail response rates were not significantly different for the procedure using one mail follow-up action by certified mail (Procedure 3) and for the procedure in which both regular and certified mail follow-up actions were included (Procedure 1).

Analysis of the Monthly Experiments

Experiment 2—Response rates for the two types of covering letters sent with the original mail query are presented in Table 6. The initial response rate for the Firm Covering Letter was 50 per cent compared with 32 per cent for the permissive version, a difference which is significant at the 1 per cent level. However, it is worth noting that with each successive follow-up action the difference between the rates became smaller so that the final mail response rates were virtually the same regardless of the type of covering letter sent with the original mail query.

Experiment 3—Response rates pertaining to the experiments with questionnaires of different lengths are presented in Table 7. The final mail response rates and the total response rates were not significantly different between the long and short forms. There was, however, a difference in the initial response rates. The short Smoking Query elicited a significantly higher initial response rate than the longer Regular Query. On the other hand, the initial response rates to the Residence Query and the Regular Query were not significantly different. The short Smoking Query was substantially shorter than the short Residence Query. This fact was particularly evident if the decedent was a lifetime nonsmoker in which case check box replies to three simple questions supplied all the requested information about the decedent for the short Smoking Query.

Further Analysis of Response Rates for Informants

Analysis of response rates for selected characteristics of decedents and informants available from the death certificate demonstrates that there were no significant differences in the initial response rates except for one variable, color of decedent, which was significant at the 1 per cent level. There were significant differences in the final response rates for four variables: place of death, color, sex and age, and place of residence of decedent. The findings are summarized in Table 8.

Initial response rates were analyzed in terms of the quality of the completed mail form. The questionnaire was evaluated on the basis of the number of sections completed and the quality of the

information supplied, and was given a final rating of "first quality" or "second quality." The first quality forms were returned more rapidly than the second quality forms. Fifty-four per cent and 41 per cent, respectively, of the first quality and second quality forms were replies to the first mailing.

Institution Response Rates

For deaths occurring in a hospital or other medical-care institution, the name of the institution of death was identifiable from the death record itself. Other information needed for querying an institution, such as the name of the medical director or superintendent, and the street address, was obtained from one of several directories. In particular, the Directory of the American Hospital Association,[4] the Modern Hospital Directory,[5] the various state listings prepared under the Hill-Burton Act, and occasionally, the telephone directory were useful.

Two mailing actions were conducted with institutions. The first query to an institution was sent by regular mail. If a reply was not received within 14 days, a follow-up was sent by certified mail.

A total of 421 institutions identified on the death certificate was queried in this study with results given in Table 9. These institutions can be distinguished on the basis of whether or not they are included in the Directory of the American Hospital Association. In general, hospitals are included in the directory, whereas other types of medical-care institutions such as nursing homes and sanitoriums are not. Although there is no difference between the two types of hospitals with respect to the initial response rate, the total response rate for institutions listed in the American Hospital Association Directory was 12 per cent higher than for the other institutions. The difference in the total response rate between the two types of institutions is significant at the 1 per cent level.

Conclusions concerning response rates from institutions in the Illness Study of Deceased Persons may be summed up as follows: (1) The total response rate for institutions identified on the death record was 98 per cent, (2) over 60 per cent of these institutions responded to the original mailing by returning queries within a 14-day period, and (3) the nonresponse rate is lower for AHA-listed than for unlisted institutions.

Table 6—Informant Response Rates by Type of Covering Letter and Action which Elicited the Response: Pennsylvania Mortality Study

Action Eliciting Response	Type of Covering Letter Sent With Original Mail Query			
	Firm		Permissive	
	Per cent	Cumulative Per cent	Per cent	Cumulative Per cent
Nonresponse	6		5	
Response	94		95	
Original mail query	50	50	32	32
First mail follow-up	22	72	27	59
Second mail follow-up	17	89	28	87
Personal interview	5	94	8	95
Sample size:	329		329	

Table 7—Informant Response Rates by Length of Questionnaire and Action which Elicited the Response: Pennsylvania Mortality Study

Action Eliciting Response	Type of Query and Length of Form					
	Regular Query (Long)		Smoking Query (Short)		Residence Query (Short)	
	Per cent	Cumulative Per cent	Per cent	Cumulative Per cent	Per cent	Cumulative Per cent
Nonresponse	6		5		8	
Response	94		95		92	
Original mail query	43	43	54	54	49	49
First mail follow-up	24	67	22	76	23	72
Second mail follow-up	22	89	10	86	16	88
Personal interview	5	94	9	95	4	92
Sample size:	637		180		256	

Summary and Conclusions

A summary of the response rates for each of the sources of information identified on the death certificate is presented in Table 10. These rates are based on surveys conducted by the National Office of Vital Statistics to collect supplementary information about deceased persons. The collection of data from each of the four sources began with a mail survey, and follow-up mail actions were conducted on nonrespondents. Finally, other data-collection procedures were used when indicated to obtain information from the hard core nonrespondents. The initial response rate refers to the proportion who replied to the original mail survey. The final mail response rate and the total response rate, respectively, refer to the cumulative response rates on completion of the follow-up mail actions and the follow-up procedures subsequent to the mailing actions.

The follow-up actions by mail and other procedures to collect information from each of the four sources have been developed on the basis of experimental studies. Thus, the final mail response rates for funeral directors and certifying physicians, given in Table 10, are based on two mail follow-up actions, a regular mail follow-up and then a certified mail follow-up. For family informants and institutions of death the final mail response rates are based on a single certified mail follow-up action. Experimentation and experience have indicated that for funeral directors and institutions of death there is no need for follow-up actions subsequent to mail surveys. On the other hand, telephone reminders with physicians and personal interviews with informants who have not responded to the follow-up mail survey may be indicated, depending on the reliability needed in the survey data.

The final response rates for each of the sources were uniformly high, 97 per cent or higher. Particularly important from the cost viewpoint are the high response rates at the conclusion of the mail surveys. The final mail response rate is about 89 per cent for informants and better than 95 per cent for each of the other three sources. The response rates to the original mail query are lowest for informants (about 44 per cent), highest for funeral directors (about 78 per cent), and are about 65 per cent for physicians and for institutions of death. Thus, from the re-

sponse rate viewpoint, the funeral director is the most economical of the four sources to query and the informant is the least economical. It should be noted, however, that one source is not a substitute for another because different types of information are collected from each of them.

The above remarks apply to nonresponse rates only. Equally important in terms of conducting surveys are errors of response and sampling error. Some results from the studies pertaining to these matters have been reported.[6] The fact remains, however, that response rates in these follow-back studies anchored to the death record are surprisingly high as compared to those usually

Table 8—Comparison of Response Rates for Selected Characteristics of Informants and Decedents: Pennsylvania Mortality Study

Characteristic of Informant or Decedent	Sample Size	Initial Response Rate		Total Response Rate	
		Response Rate	Difference Significant at 5% Level	Response Rate	Difference Signfiicant at 5% Level
Informant					
1. Residence*					
Same address as decedent	845	44		95	
Different address	488	43	No	94	No
Address unknown	369				
2. Sex					
Male	659	44		95	
Female	993	45	No	94	No
Sex unknown	79				
Decedent					
3. Place of Death					
At home	606	42		96	
In institution	1,025	45	No	94	Yes
Other	100	43		83	
4. Color					
White	1,562	45	Yes	95	Yes
Nonwhite	169	29		84	
5. Sex and Age					
Male 20-65	551	43		92	
Male 65+	568	41	No	94	Yes
Female 20-65	243	44		91	
Female 65+	369	45		96	
6. Marital Status					
Married	998	43		93	
Never married	196	46	No	97	No
Widowed and divorced	528	45		94	
Marital status unknown	9				
7. Place of Residence					
250,000+	557	45		94	
50,000-250,000	222	47	No	95	Yes
2,500-50,000	502	43		91	
Rural	450	42		96	

* Excludes 29 cases where a query was not sent to the informant.

Table 9—Response Rates for Institutions Identified on the Death Certificate by Whether or not Listed in the American Hospital Association Directory and by the Action which Elicited the Response: Illness Study of Deceased Persons

Action Eliciting Response	Total		Institutions Listed in AHA Directory		Institutions Not Listed in AHA Directory	
	Per cent	Cumulative Per cent	Per cent	Cumulative Per cent	Per cent	Cumulative Per cent
Nonresponse	2		1		12	
Response	98		99		88	
Original mail query	63	63	63	63	63	63
Certified mail follow-up	35	98	36	99	25	88
Sample size:	421		372		49	

Table 10—Response Rates for Selected Sources of Supplementary Mortality Data Based on Surveys Conducted by the National Office of Vital Statistics

Action Eliciting Response	Source from which Data Were Collected			
	Funeral Director	Physician	Informant	Institution of Death
	Per cent			
Initial response rate	78	65	44	64
Final mail response rate	99	96	89	97
Total response rate	99	98	97	97

obtained in surveys conducted principally by mailing procedures. The fact that the surveys were sponsored by a government agency probably increased the response rates since the public recognizes the interest of the government in matters related to vital events. It is likely, also, that respondents were sympathetic to the survey objectives which deal with health problems of the Nation. It is worth emphasizing, however, that the total response rates represent the cumulative effect of a concerted and persistent series of follow-up actions which had been developed by experimental methods.

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Journal of Public Health

EDITORIALS

The Social Security Act in 1960

Since its initial enactment twenty-five years ago, the Social Security Act has been amended a number of times. This year the Congress again examined Social Security, and developed legislation which changed and improved nearly all the programs in the Act. While the 1960 legislation does not compare in significance or scope with the Social Security amendments enacted during the past decade, it does mark another step in the process of social legislation.

A very useful analysis of the amendments of 1960, the provisions of the legislation and its potentialities, has been prepared by Professor Wilbur J. Cohen of the University of Michigan.[1] This informative analysis will undoubtedly be of considerable interest to numerous public health workers. A few items will be mentioned here, but the full article should be read by anyone concerned with medical care for the aged; the old age, survivors, and disability insurance program; unemployment insurance; and maternal and child health services, crippled children's services, and child welfare services.

Thus the new law not only increased appropriations for the maternal and child health services program, for services to crippled children, and for the child welfare program to $25 million for each of these activities, but also authorized grants to public and other nonprofit institutions and agencies for research and demonstration projects concerned with child welfare. The age 50 eligibility requirement for disability benefits was removed. This will benefit an estimated 250,000 people, that is, disabled insured workers and their dependents.

The major issue before the Congress was how to extend medical services to the aged. While the contributory Social Security approach was rejected; it was recognized that many of the aged, over 65, even though otherwise self-sufficient, need help in meeting the costs of medical care. The legislation which was enacted extends the public assistance approach in terms of an expanded medical care program through matching federal funds. Professor Cohen provides an extensive analysis of the provisions and projected costs of such programs. He points out that the potential cost may be in the neighborhood of $1.5 to $2.5 billion annually from general revenues, and that the states may not be able to meet their share of the costs. Furthermore, many states require new legislative authorization and appropriations. It is clear that the 1960

legislation leaves many questions unanswered, and that the next session of the Congress will have to face the unresolved problems. Meanwhile, public health workers would do well to acquaint themselves with the 1960 amendments, to which Professor Cohen's paper provides a useful overview.

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A Look at Schools of Public Health

FOR over fifty years the American Medical Association has published an annual survey of medical schools. This compendium of information has provided an extremely useful source of data for anyone concerned with medical education. A similarly comprehensive picture of schools of public health has not hitherto been available.

Nor is this surprising. Schools of public health are quite recent in origin. The appearance of modern public health in the United States did not immediately bring into being the school of public health. The earliest teaching was carried on in medical schools where public health became identified with bacteriology. This was reasonable, for environmental sanitation and control of communicable disease were the chief public health responsibilities and effective action was based on a sound knowledge of bacteriology. As early as 1897, Hermann Biggs urged that physicians be trained for careers in public health, and he outlined the idea of an organized school of public health.[1] In 1913, the Harvard Medical School and the Massachusetts Institute of Technology jointly organized the first graduate school of public health in the United States. Its three sponsors were W. T. Sedgwick, M. J. Rosenau, and G. C. Whipple. The joint school was discontinued in 1922 for legal reasons, and each institution then continued its own school of public health.

During the decade 1910-1920, according to returns from a nation-wide survey made late in 1918, twelve institutions, all of them medical schools except for one (M.I.T.), offered formal instruction in public health leading to some academic degree, mainly the Dr.P.H. The first degree was awarded by Harvard in 1911. The University of Pennsylvania awarded its first degree in 1912. Altogether, no more than 100 degrees had been awarded up to 1920, and the great bulk of these were from the University of Pennsylvania, Harvard University, and the Massachusetts Institute of Technology. The two oldest schools at present, Johns Hopkins and Harvard, are only about forty years old. Most of our present schools are less than twenty years old.

Until the twenties, training needs were thought of in modest terms because the objectives of public health were themselves relatively modest, in that they were focused chiefly on communicable disease control, environmental sanitation, and undernutrition. These problem areas were considered as being relatively simple etiologically and amenable to straightforward technical and authoritarian means of control. In those earlier years the physician and the engineer dominated the field of public health in more or less coordinate rank. Such special training as they received for their tasks was highly practical, and was secured chiefly through short periods of apprenticeships followed by the long lessons of experience. However, the fact of the matter was that there were not enough competent, trained people. This became clearly evident when the Rockefeller Sanitary

Commission undertook to combat hookworm infection. Furthermore, no institution in the United States was found to have fully adequate facilities for teaching public health.[2] Out of these needs the School of Hygiene and Public Health was eventually created at Johns Hopkins which opened in 1918. The curriculum comprised physiology, epidemiology, bacteriology and immunology, chemistry, medical zoology and protozoology, virus diseases, and vital statistics. Public health administration was added somewhat later. The purpose of the school was to train public health officers.

Since then schools of public health have grown and developed as the complexion of community health has altered. As community health action takes on new dimensions, the schools of public health will of necessity be involved. For this reason, to understand what is likely to happen one must have a picture of the schools as they are today. Questions have frequently been asked about the faculties, students, curricula, finances, and other aspects of the schools of public health, but comprehensive answers are not readily available. The current issue of the Journal makes available a comprehensive view of the schools along these lines. We anticipate that this kind of report will be made available for scrutiny by public health workers and other interested persons each year as data are collected from the several institutions. We feel that as information accumulates it will provide a useful basis for constructive action as it appears necessary in response to changing needs.

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2. Flexner, Simon, and James, Thomas. William Henry Welch and the Heroic Age of American Medicine. New York, N. Y.: Viking Press, 1941, p. 353.

LETTER TO THE EDITOR

To the Editor:

Re: "Quo Vadis—Public Health?"

In an interesting letter to the editor (this Journal, June, 1960) T. K. Callister, M.D., associate in medical economics, University of California School of Public Health, Los Angeles, underlines the necessity for public health to focus on "the medical problems, and interrelated to these the socioeconomic problems of chronic disease and particularly those related to the older age group."

Dr. Callister suggests: "That schools of public health in the education of future medical administrators should turn more attention to the allied fields of socioeconomics and business administration, and less to conventional public health subjects of diminishing significance."

Such public health subjects of diminishing significance in Dr. Callister's opinion include communicable disease, epidemiology, sanitation, environmental hygiene, maternal and child health, public health aid nursing, and health education.

Again, I quote: "Therein public health has run out of field of conventional endeavor as many of the old activities have been superseded by private medicine and the recession of communal disease."

I take it that Dr. Callister is referring to public health activities in the United States and countries in which the health conditions are more or less comparable. Obviously in the larger parts of the world the "classical" public health activities are still the dominating ones of communicable disease, environmental sanitation, maternal and child health, nutrition, and health education of the public.

But even in countries with health services at a higher and more "sophisticated" level I wonder whether Dr. Callister's selection of priorities for public health education and practices is sufficiently wide. He would have more or less general support I believe in emphasizing the importance of chronic disease, medical care of the aged, and the socioeconomic aspects of disease and health. I for one would also strongly support his view as far as the necessity is concerned of better training for public health doctors in formal economic and business administration. On the other hand, I am not able to follow him when he states, for example, that epidemiology, environmental hygiene, maternal and child health, public health nursing, and health education have become of relative diminished significance. This certainly does not hold true for a number of "advanced" countries, including most European countries. On the contrary, widening and intensification of maternal and child health services (covering also mental health), new environmental hazards (ionizing radiation, air pollution, noise and vibration, food additives, etc.) represent most stimulating challenges to public health activities, not to speak of the problems relating to town and country planning, housing, and related problems. It is only necessary to mention heart and circulatory diseases, obesity, and caries of the teeth to be reminded of the necessity of increased public health activities in the field of nutrition; or the opposition toward fluoridation of drinking water and the magic attitude of the population toward drugs, to realize the tremendous task which still lies before us in the field of health education of the public (or education in scientific thinking generally for that matter).

To this Dr. Callister might answer that in a short letter to the editor it was not his intention to be exhaustive, but only to draw attention to a few essentials. However, the main reason for the present comment is found in the following statement by Dr. Callister: "It would seem the modest expansion from the conventional curriculum as has been undertaken has unfortunately deviated into the less effective channels of sociology and psychology. These are admirable disciplines, but it is not likely to be sociologists nor psychologists that will make the type of public health administrator that the future seeks."

Here I heartily disagree with Dr. Callister. Psychiatry, or rather psychology and psychopathology in the wider sense, per se, and related to sociology ("social psychiatry") already for a long time, and unfortunately with little success, have been knocking on the door of public health as one of the basic functions of the future. Unlike most other "big specialities" (surgery, internal medicine, pediatrics) the health problems related to the human mind enter into and interfere with most health activities at all ages, in all social and economic classes and all over the world. The public health officer who is not aware of this fact and not sufficiently familiar with the factors and tools at his disposal will rapidly lose his grip.

The fact that some of these disciplines, scientifically speaking, are still in their childhood or adolescence should of course not discourage public health from playing an active part. So did public health for example in environmental sanitation or communicable dis-

ease long before a sound scientific basis for such activities had been found.

But there is another and perhaps even more important omission in Dr. Callister's list of priorities for future public health activities: the general planning, coordinating, and evaluating function.

Just to mention a very few examples of questions which may easily be posed to the health administration today:

What is the need for hospital beds of various types?

How is a child-guidance center to be staffed?

To what extent should and could chronic psychotic patients be cared for outside hospitals and other medical institutions?

Who should be responsible for the after-treatment and rehabilitation of patients suffering from chronic heart ailments, rheumatism, and other chronic diseases?

What is the role of the health services in combating traffic accidents, drug addiction, or alcoholism?

What is the optimal number of specialists in a given society within the various specialities of medicine and related functions, and to what extent is the education adapted to the needs?

Is the working relationship between the general practitioner, the specialist, and the hospital in a given area satisfactory?

The development of a comprehensive health service meeting the diversified needs of our day has become a tremendous undertaking. It is not only so expensive that political and appropriating bodies will rightly press the public health expert for a list of health priorities at any given moment; but also, a fully fledged system of health services is so complex, with all its highly specialized activities, its border-line problems toward other activities (education, socioeconomic, psychological, and architectural), that there must somewhere exist a sufficiently strong body dealing with planning, coordination, and evaluation.

This is the fundamental task of the public health services of the future. In its activities the public health services of the future will to an increasing extent make use of epidemiological methods for the examination and evaluation of health activities generally. As a matter of fact, it is high time that we consider whether the old term "public health" should not be substituted by some thing more in tune with the tasks of our days in the direction of "coordinating and constructive medicine."

Finally, Dr. Callister may be right in his statement that both in the United States and in the United Kingdom public health has lost stature and has been limited to a more narrow scope of activities. If this is true, however, it may be questioned whether this regrettable development did not start earlier in the United States than in the United Kingdom. Also, the reasons for any such development obviously differ in the two countries. It should be noted, however, that any such development is not a general finding in the world today. On the contrary, in several "advanced" as well as in "technically underdeveloped" countries public health at present is enjoying a renaissance so far as public interest, investment, and recruiting is concerned. In such countries medical personnel in a stricter sense as well as auxiliary personnel (psychologists, social workers, nurses, etc.) very often gives expression to the greater satisfaction they find in this type of work than in the "clinical isolation" of the specialized ward or practice.

The most pressing problems in these countries are at present to bring the medical curriculum in tune with these developments and to "up-grade" this new speciality in medicine (constructive and coordinating medicine) in relation to the older specialities.

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SCHOOLS OF PUBLIC HEALTH IN THE UNITED STATES AND CANADA: 1959-1960

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Introduction

ALTHOUGH the public health movement dates from a century or more ago, concerted efforts toward professional preparation of public health workers did not begin until about the time of the first World War. In general, this preparation has consisted of a year of graduate education in an institution known as a school of public health. There are 13 such schools now accredited for the degrees of master of public health,* doctor of public health, and master's degree in health education (other than M.P.H.).† The criteria for accreditation are formulated by the American Public Health Association's Committee on Professional Education, which is also the body responsible for making recommendations regarding accreditation to the Executive Board of APHA.

In 1945, the Association of Schools of Public Health requested APHA to act as accrediting agency,[1] and the general policies established at that time have continued to the present. The current criteria for accreditation and a list of the accredited institutions are shown as Appendix A and Appendix B, respectively.

Several aspects of schools of public health are here described in accordance with information received in APHA from the schools themselves. While an accreditation visit is made to each school approximately every three years by an accreditation team of the APHA, information is furnished annually by the schools. A questionnaire referring to the activities of the year just completed is forwarded by the schools in June, and individual cards on faculty members and students are also collected in the APHA headquarters.

This presentation, therefore, cannot pretend to be an extensive analysis of the schools of public health, as such a study would require more intensive work and indeed a visit of appreciable duration to each school by a team of observers. Such a study was made by the USPHS in 1950, and is reported in a publication[2] of that organization. Another review, covering a ten-year period, was made by Smillie and Luginbuhl[3] more recently.

At the present time, a comprehensive study is contemplated by a Joint Committee made up of members from the American Public Health Association, the Association of Schools of Public Health, and the Association of State and Territorial Health Officers, with representatives as well from the Canadian Government and the U. S. Public Health Service.

This presentation, however, can serve to bring pertinent facts before the public health profession and other groups interested in education and training in this field. If repeated annually, certain trends might be discerned and conclusions drawn about the direction which the preparation of public health workers

* In Canada, the equivalent is Diploma in Public Health (D.P.H.).

† At the time this material was prepared, there were 13 accredited schools of public health. More recently another school has been added to this list, making the present total 14.

is taking. In some instances, a number of questions hitherto unanswered will now be made available for scrutiny and analysis. In any case, suggestions as to improvement in either collection of data or presentation of material will always be welcome.

Administration

In every instance, the North American school of public health is part of a university. Within the 13 university structures, there are several patterns of organization which may generally be described as follows: (a) The school of public health is a department of the medical school (in three instances) and the director thereof is responsible, like any other department head, to the dean of the medical school; (b) the school of public health (in five other cases) is part of a unit of health or medical affairs, which is headed by a vice-president (or vice-chancellor, or director of health affairs, or dean of medical science); (c) the five remaining schools of public health are directly under the president or chancellor of the university (or, in one instance, the board of governors). The ten schools comprising the second and third groups may be generally considered as relatively autonomous, and as occupying organizational positions on a par with other schools of the university, such as law, business, etc. Whether the esteem and prestige in which a school of public health is held in its university is related to its organizational level can only be surmised, as measurement of these qualities has not as yet been perfected. Using "impressions gained" rather than any system of measurement, it may be said that factors other than organizational structure play a more important role, most of these factors coming under substantive headings.

Schools of public health are organized into a number of departments or divisions, or sections, each responsible for a teaching and research program in one or more subjects. In Table 1, the numbers of schools which have departmental units are listed for each subject.

Table 1—Number of Schools of Public Health Having Major Departmental Units

Public health administation or public health practice	12
Sanitary science or environmental sanitation or public health engineering	12
Biostatistics	11
Epidemiology	7
Microbiology or experimental medicine or medical technology	6
Public health education	6
Public health nursing	6
Tropical medicine or pathobiology	6
Hospital administration	5
Nutrition	5
Occupational health or industrial hygiene	5
Maternal and child health	4
Continuation education	2
Epidemiology and biostatistics	2
Epidemiology and microbiology	2
Physiological hygiene	2
Adult health	1
Biochemistry	1
Biochemistry and nutrition	1
Community psychiatry	1
Environmental medicine	1
Individual and community health	1
Industrial hygiene and air pollution	1
Medical care administration	1
Mental health	1
Parasitology	1
Personal health	1
Public health administration and epidemiology	1

While certain key courses basic to the field of public health are taught in all schools, the variation in organization gives greater or lesser relative emphasis to the range of subjects, depending on the interests within a school of public health. It should be recalled that the original subjects in public health training were administration, sanitation, biostatistics, and epidemiology. The array

of departmental designations which are shown in Table 1 indicates the extent of the developmental process in the 13 schools of North America. In some instances, two of the original departments have combined, but this has no doubt been due to local influences such as the interests of a particular individual or the personnel shortages which beset the field from time to time. Needless to say, no attempt at standardization or departmental structure should be recommended, though some clarification of nomenclature might perhaps make for ease in understanding the problems involved therein.

Physical Premises

Among the variables which characterize schools of public health is their physical space. While some of the schools have available to them premises under the control of another unit of the university, such as the medical school, each has a number of rooms for its own use. The premises under the control of the school of public health range from 10,000 square feet in one school to 155,000 in another, with an average of about 52,000 for all 13. Included in these spaces are classrooms, laboratories, library or reading room, offices for faculty, and other facilities for students.

Of the 13 universities, six have separate buildings which are known as the school of public health. Another plans to open such a building in the next year or two, and the others occupy premises allotted to them, but shared with other units of the university, chiefly the medical school.

In eight of the schools of public health, there is a reading room or library to which students have access. The average number of volumes in these eight libraries is 9,000 and the average number of periodicals is 250. Eleven schools report that the medical school library is on the same campus, with an average number of 200,000 volumes and 3,300 periodicals. In addition, eight schools of public health are on the same campus as the general university library with a vast wealth of material for the use of students and faculty alike.

Table 2—Summary of Financial Statements of Schools of Public Health: 1959-1960

Income

	Schools	Total Amount	Average	Range
a. Appropriated by university	11	$ 2,916,969	$ 265,179	$ 50,292 to $ 679,880
b. Income from endowments	4	995,502	248,875	4,647 to 389,003
c. Tuition fees	5	440,902	88,180	50,000 to 125,474
d. Teaching and training grants	12	4,453,800	371,150	12,855 to 683,212
e. Research grants	11	5,950,205	550,019	65,699 to 1,583,550
f. Income from services and contracts	8	436,046	54,506	1,715 to 213,700
g. Other income	4	446,746	111,686	28,500 to 238,518
Totals	12*	$15,640,170	$1,303,348	$213,708 to $3,913,337

* Represents total number of schools in study reporting one or more of these sources of funds.

Table 3—Summary of Financial Statements of Schools of Public Health: 1959-1960

Expenditures

	Schools	Total Amount	Average	Range
a. Professional salaries	11	$ 4,761,508	$ 432,864	$ 92,185 to $ 939,803
b. Nonprofessional salaries	11	2,360,343	214,577	18,900 to 431,356
c. Travel allowances and expense accounts	11	428,714	38,974	1,000 to 134,155
d. Equipment and supplies	11	1,575,900	143,264	11,050 to 486,818
e. Administrative and maintenance expenses	8	1,249,459	156,182	7,546 to 439,879
f. Other expenditures	9	1,100,141	122,238	9,700 to 274,653
Totals	11*	$11,476,065	$1,043,279	$140,381 to $2,706,669

* Represents total number of schools in study reporting one or more of these types of expenditures.

Table 4—Schools of Public Health: 1959-1960—Age and Sex of Faculty Members by Title

Male

Age	Professors	Associate Professors	Assistant Professors	Lecturers, Instructors	Other	Total
Not stated	6	2	0	32	3	43
Under 30	0	0	7	16	20	43
30-34	2	4	25	29	39	99
35-39	7	30	38	45	40	160
40-44	16	34	33	32	12	127
45-49	33	35	17	53	12	150
50-54	33	22	11	48	7	121
55 plus	71	19	9	74	6	179
Total: Male	168	146	140	329	139	922

Female

Not stated	0	1	2	7	3	13
Under 30	0	0	0	3	7	10
30-34	0	0	5	10	15	30
35-39	0	1	8	6	14	29
40-44	1	1	7	21	11	41
45-49	2	10	17	16	6	51
50-54	3	15	10	14	3	45
55 plus	12	13	4	11	7	47
Total: Female	18	41	53	88	66	266
Total: Both sexes	186	187	193	417	205	1,188

Finances

The financial statement of each school is divided into two parts: one for income and one for expenditures. Under the former, seven categories are listed in Table 2, and under expenditures, six items are listed in Table 3.

It will be noted that not all schools reported each item, as methods of accounting are different in the 13 universities. In view of this variation, these summaries are presented with the *number* of schools reporting each item, the *total*, for each item, the *range* (lowest figure to highest) and the *average* or total divided by the number of schools.

Table 5—Schools of Public Health: 1959-1960—Age of Faculty Members by Subject Taught

Subject	Age Groups								
	Not Stated	Under 30	30-34	35-39	40-44	45-49	50-54	55 Plus	Total
Administration or practice of public health	2	2	6	12	12	16	23	38	111
Behavioral and social sciences	2	2	2	7	5	6	4	1	29
Biostatistics	4	17	16	13	10	20	3	7	90
Chronic diseases	0	0	2	2	4	4	2	3	17
Dental public health	4	0	0	1	1	1	2	4	13
Environmental sanitation	4	7	12	16	15	15	9	21	99
Epidemiology	0	1	15	23	10	12	15	19	95
Health education	3	1	3	6	6	11	7	9	46
Hospital administration	17	3	10	9	13	19	18	18	107
Maternal and child health	0	3	3	6	7	11	7	15	52
Medical care	1	0	4	5	8	10	5	5	38
Mental health	1	0	3	5	10	11	7	6	43
Microbiology and laboratory public health	2	4	12	12	13	12	7	18	80
Nutrition	6	2	12	22	10	9	10	14	85
Occupational health	2	1	5	16	13	14	15	21	87
Physiological hygiene	3	0	2	4	4	4	2	4	23
Public health nursing	2	3	2	1	8	8	13	9	46
Radiation health	0	2	3	10	2	2	—	1	20
Tropical medicine, entomology, parasitology	3	3	12	14	13	10	9	7	71
Other	0	2	5	5	4	6	8	6	36
Total	56	53	129	189	168	201	166	226	1,188

Table 6—Schools of Public Health: 1959-1960—Faculty Titles by Full-Time: Part-Time Status

	Full-Time	Full-Time in University; Part-Time in School of Public Health	Part-Time	Total
Professors	134	28	24	186
Associate professors	112	33	42	187
Assistant professors	113	35	45	193
Lecturers and instructors	72	60	285	417
Others	123	19	63	205
Total	554	175	459	1,188

While the gross figures are interesting, the wide range of income or expenditures indicates that the schools operate on very different financial levels. A more significant set of figures would be the expenditures per degree granted, as calculated in dividing the 1959-1960 expenditures reported by each school by the number of graduates from that school in the same academic year. For the 11 schools that reported expenditures, there were 603 graduates, which gave an "average cost" per student of $19,032. The range among these 11 schools was from $6,533 to $64,140.

It is clear of course that not all the expenditures of a school of public health pertain directly to the teaching program. The expansion of research in recent years has produced increased budgets in all such institutions, while the annual number of graduates has increased only moderately. Also, the proportion of total expenditures devoted to research varies considerably from one school to another, and the figures given above do not consequently represent a true, or even approximate, picture of the cost of training a public health worker. One objective in the collection and analysis of information is the refinement of methods so that more representative figures may be obtained and recorded in the future.

Faculty

There were 1,188 faculty members reported, of whom 922 were male and 266 female. Their distribution by age and title is shown in Table 4.

It will be noted that the numbers of higher rank faculty members increase in the older age groups, which presumably is to be expected. The distribution for women faculty members differs appreciably from that of men, due no doubt to their more recent entry into public health teaching.

A summary of the subjects taught by the 1,188 faculty members according to their age groups is shown in Table 5. While the figures in any one subject are too small to enable one to draw definite conclusions, there are one or two points worthy of mention. The teachers in public health administration or practice are more numerous in the older age groups, whereas in biostatistics, nutrition, and tropical medicine, to mention but a few, this is not the case. Whether this is a reflection of the nature

of the subjects themselves is interesting to contemplate.

The subjects were grouped arbitrarily, merely for convenience and simplicity. It is expected that changes in presentation will be made as other subjects emerge from year to year.

In Table 6, the number of faculty members in full- or part-time positions, is shown according to their titles. The number of full-time faculty members totals 554, or about 47 per cent, whereas 459 or approximately 38 per cent are part-time, that is, they have their primary occupation outside the university. The middle category of 175 faculty members represents persons who are primarily appointed in other parts of the university, such as the medical school, but who contribute to the teaching program in the school of public health. In a way, this group of about 15 per cent may be considered as an indication of the closeness of cooperation between the school of public health and other units of the university.

Table 7—Schools of Public Health: 1959-1960—Faculty Members by Full-Time: Part-Time Status and Subject Taught

Subject	Full-Time	Full-Time in University; Part-Time in School of Public Health	Part-Time	Total
Administration or practice of public health	36	10	65	111
Behavioral and social sciences	12	7	10	29
Biostatistics	66	6	18	90
Chronic diseases	8	0	9	17
Dental public health	0	8	5	13
Environmental sanitation	38	18	43	99
Epidemiology	60	8	27	95
Health education	25	2	19	46
Hospital administration	19	7	81	107
Maternal and child health	28	10	14	52
Medical care	20	1	17	38
Mental health	18	10	15	43
Microbiology and laboratory public health	39	29	12	80
Nutrition	54	9	22	85
Occupational health	30	8	49	87
Physiological hygiene	13	5	5	23
Public health nursing	26	2	18	46
Radiation health	7	11	2	20
Tropical medicine, entomology, parasitology	49	10	12	71
Other	6	14	16	36
Total	554	175	459	1,188

Table 8—Schools of Public Health: 1959-1960—Faculty Members by Title and Professional Category

	Doctors							
	Med.	Dent.	Vet.	Other	Nurses*	Master's	Others	Total
Professors	102	2	2	52	7	16	5	186
Associate professors	68	1	1	78	11	23	5	187
Assistant professors	73	1	—	67	14	32	6	193
Lecturers and instructors	145	12	6	57	27	104	66	417
Others	46	1	2	32	4	87	33	205
Total	434	17	11	286	63	262	115	1,188

* Among the 63 faculty members in the category "Nurses," five held a doctoral degree and 46 others a master's degree.

Table 9—Schools of Public Health: 1959-1960—Faculty Members by Professional Category and Subject Taught

Subject	Doctors				Nurses*	Master's	Others	Total
	Med.	Dent.	Vet.	Other				
Administration or practice of public health	92			6	1	8	4	111
Behavioral and social sciences				13		10	6	29
Biostatistics	8	1		47		22	12	90
Chronic diseases	13			2	2			17
Dental public health		13						13
Environmental sanitation	2		1	24		57	15	99
Epidemiology	67	2	2	13	1	6	4	95
Health education	3	1		15	1	24	2	46
Hospital administration	23			4	1	47	32	107
Maternal and child health	37			2	7	6		52
Medical care	15		1	6		10	6	38
Mental health	23			6	5	4	5	43
Microbiology and laboratory public health	24		3	34		12	7	80
Nutrition	28			36		19	2	85
Occupational health	45			18	2	17	5	87
Physiological hygiene	10			12			1	23
Public health nursing				1	42	2	1	46
Radiation health	7			7		4	2	20
Tropical medicine, entomology, parasitology	27		1	34		6	3	71
Other	10		3	6	1	8	8	36
Total	434	17	11	286	63	262	115	1,188

* Among the 63 faculty members in the category "Nurses," five held a doctoral degree and 46 others a master's degree.

Table 7 lists the full-time and part-time members of the 13 faculties according to subjects taught. Several interesting points may be observed, as, for example, the large number of part-time faculty members who participate in the teaching of public health administration and practice. This may be accounted for by the numbers of health personnel who teach during field observations of public health students, or who come to the school to present special aspects of public health practice. The large number in occupational health and environmental sanitation may be similarly explained. The 81 part-time out of a total of 107 teachers in hospital administration are largely hospital administrators who act as preceptors during the field practice year, which is a part of this course. The relatively large number of persons in microbiology who are primarily in other parts of the university indicates the close cooperation between the school of public health and the laboratory sciences of, for example, the medical school.

In Table 8, the faculty members are presented by professional category and title. It will be noted that 434 faculty members are physicians, and 286 hold other doctors' degrees (such as Ph.D., D.Sc., etc.). Table 9 is a summary of the subjects taught by the several professional categories. It should be mentioned, incidentally, that faculty members are enumerated by *subject taught* rather than by unit to which attached. Thus, the summaries presented here do not reflect the organizational structure of the schools.

An interesting comparison may be made with the figures cited by Smillie. For 1957-1958, there were 120 professors and 113 associate professors, in addition to 21 vacancies, among the full-time faculties of the 13 schools, a total of 254. In 1959-1960, there are 134 and 112, respectively, or a total of 246. The present compilation did not take into account vacancies, but it seems that some of the 21 of two years ago still exist.

Curriculum

The curriculum in each case is closely related to the particular degree offered. For the M.P.H.* (master of public health), there is a *core curriculum*, which includes several basic public health sciences and public health practices (see Appendix A). Generally,

* In Canada, the equivalent degree is D.P.H. (diploma in public health).

Table 10—Applications and Acceptances in Ten Schools of Public Health: 1959-1960

Professional Category	Number of Applications	Number of Acceptances	Per cent Accepted
Veterinarians	29	26	89.6
Physicians	316	270	85.3
Engineers	64	51	79.7
Statisticians	55	43	78.2
Public health nurses	182	142	78.0
Nutritionists	36	27	75.0
Sanitarians	109	78	71.6
Health educators	152	99	65.1
Dentists	77	48	62.3
Hospital administrators	260	90	34.6

the schools require a candidate for the M.P.H. degree to take one comprehensive course, as a minimum, in each of the following subjects: public health administration; biostatistics, sanitary science, and epidemiology. Additional required courses include, in various schools, such subjects as tropical medicine, labor relations, microbiology, nutrition, public health nursing, occupational health, and others. Beyond this, there is a wide range of elective courses in most schools.

While some schools consider the M.P.H. a broad degree covering most of the fields in public health, other institutions offer a more specific degree as well. Among these are master of industrial health—M.I.H. or M.P.H. (I.H.), diploma in dental public health —D.D.P.H., master of public health and tropical medicine—M.P.H. and T.M., and others. The recent inclination seems to be toward further splintering, and intensive study of the pros and cons of this trend is indicated, with the objective of standardizing the M.P.H. or D.P.H.

Table 11—Geographic Distribution of Graduates from Schools of Public Health: 1959-1960 by Professional Categories

	Doctors				Nurses	Master's	Others	Total
	Med.	Dent.	Vet.	Other				
United States								
Alabama	1	2				1	1	5
Alaska	1				1		1	3
Arizona						1	1	2
Arkansas	1				1			2
California	18	1			6	6	28	59
Canal Zone	1							1
Colorado	3				1	1	2	7
Connecticut	3			1	4	2	3	13
District of Columbia	2				1			3
Florida	2			2	1		4	9
Georgia	1	1	1				3	6
Hawaii	1					1		2
Idaho						1	3	4
Illinois	4	1	1		3	3	6	18
Indiana						1		1
Iowa		1			1			2
Kansas			1		1	1	2	5
Kentucky	2		1		1		3	7
Louisiana	1		1		3		2	7
Maine							1	1
Maryland	3	2			5	3	5	18
Massachusetts	5	1		1	2	5	3	17
Michigan	5	2	2		12	1	10	32
Minnesota	1				14	5	15	35
Mississippi	1				1			2
Missouri	2				1	1	2	6
Montana					1		2	3
Nebraska	3						1	4
Nevada				1			1	2
New Hampshire							1	1

Table 11—(Continued)

	Doctors				Nurses	Master's	Others	Total
	Med.	Dent.	Vet.	Other				
New Jersey	1		1		1	3	2	8
New Mexico						1	2	3
New York	20			1	5	3	24	53
North Carolina	2		3		4		4	13
North Dakota					1	1		2
Ohio	6		4	1	4	3	12	30
Oklahoma	1	1						2
Oregon	2						4	6
Pennsylvania	10	3	2	2	12	10	13	52
Puerto Rico	7						9	16
Rhode Island							2	2
South Carolina	3				3		1	7
South Dakota	1					1	1	3
Tennessee			1		2		2	5
Texas	3	1	1		1	1	2	9
Virginia	4	3	1		3	1	2	14
Washington	3				2		4	9
West Virginia	1							1
Wisconsin	4				7		1	12
Wyoming	1							1
Total—USA	130	19	20	9	105	57	185	525
Canada								
Alberta	1							1
British Columbia	2				1			3
Manitoba	2				1		1	4
Newfoundland	1						1	2
Nova Scotia	1						1	2
Ontario	17	1					10	28
Quebec	7	3	2	1	1		11	25
Saskatchewan	2				1			3
Total—Canada	33	4	2	1	4	0	24	68
Other Countries								
Afghanistan	1							1
Argentina	1							1
Australia	1							1
Bolivia							1	1
Brazil	1	1						2
British Honduras	1							1
Burma	1						2	3
Ceylon	1						1	2
Chile	2							2
China	3						1	4

Table 11—(Continued)

	Doctors							
	Med.	Dent.	Vet.	Other	Nurses	Master's	Others	Total
Colombia	6			1			3	10
Costa Rica				1			2	3
Cuba	1							1
Denmark	1							1
Ecuador	3	1					1	5
France	1							1
Ghana	1							1
Greece		1						1
Guatemala	4							4
Haiti	1							1
India	11					3		14
Indonesia	7							7
Iran	6	1				1		8
Iraq							1	1
Ireland	1							1
Israel	2						1	3
Italy	1			1				2
Jamaica	1							1
Japan	1							1
Korea	2							2
Lebanon	1					1		2
Mexico	1							1
Nepal							2	2
Netherlands	1							1
Nicaragua	1							1
Nigeria	1							1
Norway	1	1						2
Pakistan	4						1	5
Panama	1						2	3
Paraguay	1						1	2
Peru	2							2
Philippines	11		1		2		1	15
Poland	1							1
Portugal	1							1
Surinam	2							2
Switzerland	1							1
Thailand	7	1						8
Turkey	1							1
United Arab Republic	2	1	1				3	7
United Kingdom	6	1	1				1	9
Venezuela							2	2
Vietnam	1							1
Yugoslavia	1							1
Total: Other countries	110	8	3	3	2	5	26	157
Total	273	31	25	13	111	62	235	750

The master of science degree is offered by a number of schools, and here too there is considerable fragmentation. The master of science—M.S. or Sc.M., master of science in hygiene—M.S.Hyg., master of science in public health—M.S.P.H., master of hospital administration—M.H.A., master in sanitary sciences—M.S.S., and a range of other master's degrees in specific fields (nutrition, biostatistics, public health education) present an academic maze which it is often difficult to traverse. For example, a person who pursues a curriculum in health education may go to one school and receive the M.P.H., in another—the M.S.P.H.E., and in yet a third—the M.S.Hyg. or M.S.P.H. In hospital administration, nutrition, biostatistics, sanitary science, and other fields, similar discrepancies exist, thus stressing even more the need for study and standardization.

At the doctor's level, there are three degrees among which some inconsistencies may be detected. The doctor of public health—Dr.P.H., the doctor of science in hygiene—Sc.Dr.Hyg., and the doctor of philosophy—Ph.D., have some requirements in common, and yet exhibit some significant differences, such as, for example, the language requirement. In general, these advanced degrees have fewer specifics than those at the master's level, but the study which pertains to the latter would be useful here as well.

It should be mentioned that in some universities, the graduate school supervises admission to and course of study in certain of the master's and doctor's curricula, thereby complicating the problem even further.

Students

A total of 1,660 students was enrolled in the 13 schools of public health in 1959-1960, of whom 750 received de-

Table 12—Graduates of Schools of Public Health: 1959-1960 by Age, Sex, Degrees

Sex and Age	M.P.H.* D.P.H.	M.S.P.H. M.Sc.Hyg. M.S.H.Ed. M.S.S.	M.H.Adm. D.H.Adm.	Other Master's Degrees	Dr.P.H.	Other Dr.'s Degrees	Undergraduate Degrees	Total
				Male				
Under 25	3	2	3	7	—	—	—	15
25-29	67	11	17	20	1	3	—	119
30-34	115	14	6	10	4	9	—	158
35-39	103	10	3	6	5	4	1	132
40-44	52	6	—	3	1	—	—	62
45 and over	50	2	—	1	—	—	—	53
Total: Male	390	45	29	47	11	16	1	539
				Female				
Under 25	3	—	—	3	—	—	3	9
25-29	16	2	—	3	—	1	15	37
30-34	39	—	—	2	1	—	6	48
35-39	31	2	—	—	—	—	2	35
40-44	25	—	2	1	1	1	5	35
45 and over	31	3	—	—	1	2	10	47
Total: Female	145	7	2	9	3	4	41	211
Total: Both sexes	535	52	31	56	14	20	42	750

* Includes other equivalent degrees such as: D.D.P.H., D.V.P.H., M.I.H., M.P.H.(I.H.), etc.

Table 13—Graduates from Schools of Public Health: 1959-1960 by Major Subjects and Degrees Granted

	M.P.H., etc.	M.S.P.H., etc.	M.H.Adm.	Other Master's Degrees	Dr.P.H.	Other Dr.'s Degrees	Under-graduate	Total
Administration and practice	138	—	—	—	2	—	—	140
Aviation medicine	17	—	—	—	—	—	—	17
Behavioral science	—	1	—	—	—	1	—	2
Biostatistics	10	—	—	12	1	4	—	27
Chronic diseases	3	—	—	—	—	—	—	3
Dental public health	30	—	—	—	—	—	—	30
Evironmental sanitation	41	20	—	10	—	—	—	71
Epidemiology	46	4	—	—	2	—	—	52
Health education	45	—	—	—	2	2	4	53
Hospital administration	18	5	31	27	—	—	—	81
Maternal and child health	19	2	—	—	1	—	—	22
Medical care	4	—	—	—	—	—	—	4
Mental health	8	6	—	2	1	1	—	18
Microbiology and laboratory public health	23	—	—	1	—	1	—	25
Nutrition	16	6	—	1	—	3	—	26
Occupational health	19	1	—	—	1	2	—	23
Public health nursing	60	1	—	—	—	1	38	100
Radiation health	10	3	—	—	—	—	—	13
Teaching of preventive medicine	6	1	—	—	—	—	—	7
Tropical medicine, entomology, parasitology	13	2	—	3	4	5	—	27
Veterinary public health	9	—	—	—	—	—	—	9
Total	535	52	31	56	14	20	42	750

grees between July 1, 1959, and June 30, 1960.* The remainder is composed largely of those not registered for degrees, those pursuing curricula of more than a year's duration, and those whose required field work (generally of three months) puts them into a later commencement date. The data presented here refers to the 750 students who received their degrees or diplomas between July, 1959, and June, 1960, inclusive.

An attempt was made to determine the admission policy of the schools in quantitative terms. In Table 10, figures are presented from ten schools as to the number of acceptances (to graduate studies) as related to applications. The percentage acceptance "rates" show a marked variation for the several professional categories listed here, but whether these differences reflect the level of qualifications of the applicants or a

* In addition, 82 persons who had attended prior to 1958-1959 completed their requirements and received their degrees during the year now being reported. These are not included in the current compilations.

"supply and demand" situation cannot at the moment be answered. Further study along these lines is indicated in order to show whether schools of public health are able (or willing) to take a large portion of persons seeking training or whether the establishment of additional schools is indicated.

The geographic distribution of graduates according to professional categories is shown in Table 11. The figures for the United States of America and Canada are given by states and provinces, respectively, and then totaled for each of these two countries. The other countries which had graduates from the 13 schools of public health are then listed, and grand totals expressed at the end.

An opportunity is hereby afforded to the states and provinces to examine their public health training problems in relation to their personnel needs. While the numbers for any one governmental unit are too small to have real significance, an examination of changes from year to year may have some meaning. Or perhaps the fact that the numbers are small is in itself an indication of "low level" activity in public health training in some places.

As for other countries, the larger numbers of students came from countries with which strong cultural and political ties have been maintained. Another factor may be the extent to which the U.S. foreign aid programs have succeeded in offering the facilities of this country for study.

The distribution of professional categories among the USA and Canadian students may be compared to that of other countries. For the former, for example, 27.5 per cent of the graduates were medical doctors, whereas this profession comprised 70 per cent of total foreign graduates. The relative percentages among other professional groups contrast as much or more, though usually in an opposite direction. Obviously, fellowship awards for foreign study are more readily awarded to medical personnel than to others, which is perhaps a reflection of the fact that many countries have recently established schools of public health where an appreciable number of their own students are trained. Information regarding the global aspects of public health training will undoubtedly come to light as international agencies collect and publish data in this regard.

Table 14—Graduates from Schools of Public Health: 1959-1960 by Professional Categories and Sources of Sponsorship

	Doctors							
	Med.	Dent.	Vet.	Other Doctors	Nurses	Master's Degree	Other Degrees	Total
Self-sponsored	24	—	3	—	15	18	79	139
Own institution or agency or government	58	8	3	3	11	3	52	138
USPHS (various titles)	67	16	14	6	74	33	67	277
ICA	39	1	1	1	1	3	12	58
Other US agency	25	—	2	—	4	3	15	49
WHO	26	4	—	—	—	—	5	35
Funds or foundations	20	1	—	3	1	—	5	30
Other	14	1	2	—	5	2	—	24
Total	273	31	25	13	111	62	235	750

Table 15—Graduates of Schools of Public Health: 1959-1960 by Professional Categories and Major Subjects

	Doctors							
	Med.	Dent.	Vet.	Other	Nurses	Master's	Others	Total
Public health administration and practice	126					4	10	140
Aviation medicine	17							17
Behavioral sciences						1	1	2
Biostatistics	5			1		7	14	27
Chronic diseases					3			3
Dental public health		30						30
Environmental sanitation				2		5	64	71
Epidemiology	37	1	11	1	2			52
Health education	6			2	1	8	36	53
Hospital administration	6			1	1	9	64	81
Maternal and child health	19				1	2		22
Medical care	1					1	2	4
Mental health	7			5	1	2	3	18
Microbiology and laboratory public health	4		2			5	14	25
Nutrition	7		1			5	13	26
Occupational health	14				2	2	5	23
Public health nursing					100			100
Radiation health	1		1			7	4	13
Teaching of preventive medicine	7							7
Tropical medicine, entomology, parasitology	16		1	1		4	5	27
Veterinary public health			9					9
Total	273	31	25	13	111	62	235	750

In Table 12, the graduates are listed by age, sex, and degrees awarded. Some efforts have been made to group into one column such degrees as may be considered equivalent, but standardization action by the universities would help clarify and simplify presentations like this one in future years. All 13 schools gave the M.P.H. or D.P.H. or equivalent, but varying numbers awarded the other degrees this year. The 52 M.S.P.H. (or equivalent) degrees were awarded by five schools; the 31 M.P.Adm. (or D.H.Adm.) by two schools; the 56 other master's degrees by six schools; the 14 Dr.P.H. by five schools; the 20 other doctor's degrees by six schools; and the 42 undergraduate degrees by four schools.

It will be noted that women were the recipients of almost all the undergraduate degrees granted this year, but that among the other degrees, there were no startling differences between men and women students. A comparison of age distributions, except in the M.P.H. group, would not be fruitful because of the small numbers, but the ages of the M.P.H. graduates (and of the total body of 750) seem to fall in expected patterns.

Table 13 is a summary of the graduates by major subject and by degree granted. The largest group was in the field of public health administration or

practice (with 138 receiving an M.P.H. or equivalent, and two the Dr.P.H.). Other large groups were public health nursing, hospital administration, and environmental sanitation. However, some attention should also be directed to the very few students in chronic diseases and medical care, hardly commensurate with the considerable interest and importance attached to these problems in present-day America.

The 81 persons who graduated in hospital administration represent only those who received training in schools of public health. Other curricula in hospital administration are given by schools of business or of medicine or, in one case, of graduate studies. These 81 graduates, therefore, do not represent this year's addition to the manpower pool in this field. Also, only 31 of the 81 received the degree of M.Hosp.Adm. or D.Hosp.Adm., the other 50 being awarded other degrees. This situation regarding degrees has already been mentioned.

Table 14 gives the professional categories and sponsorship sources of the 750 graduates. By far the largest number of students received their support through the several traineeship programs of the USPHS, not only in total numbers, but also in almost all professional categories.

It is perhaps unique in the field of public health that such a large proportion (about 82 per cent) of the graduates have been enabled to go to a university for training under fellowship grants rather than through the expenditure of their own personal funds. Of course, these awards do not generally cover *all* the costs of transportation, tuition, living expenses, etc., but they ease the burden that a student's own family would otherwise pay. One important point is that public agencies, in recognizing their responsibilities for training, have provided funds for this purpose. Whether shortages in public health personnel can be reduced by further expanding the use of public (and private) training funds should be an ever-present consideration.

Table 15 gives the major subjects studied by persons in the several professional categories. The distributions are largely as expected, though one or two points are worthy of mention. Of the small number of persons who took medical care as a major subject, only one was a physician, and in chronic diseases the only profession represented was that of nursing. Only one of the seven physicians who had "teaching of preventive medicine" as a major subject was from the USA, the other six coming from other countries. The question arises whether the latter program in schools of public health should not be strengthened, in view of the fact that departments of preventive medicine and public health in schools of medicine, dentistry, veterinary medicine, and others are in need of well trained personnel.

One of the surprising facts about graduate schools of public health is the relatively high ratio of faculty to students. Taking figures which represent full-time faculty only and graduates (all degrees), the following over-all ratio was derived: 135 students per 100 faculty members. For individual schools, this figure varies from 55 to 303 students per 100 full-time faculty members. It is true that some faculty members spend their time primarily on research and do little or no teaching, but even so there is probably room for appreciable increases in student enrollment with only slight or moderate enlargement of teaching staff.

Continuation Education

Although providing formal graduate study represents the primary objective of a school of public health, 5 of the 13 schools have undertaken, in addition,

to offer postgraduate, short-term courses for health workers. Another school of public health participates in general university-wide continuation education and is responsible for the public health component of the program. The figures which appear below refer only to the five institutions which conduct their own programs.

Thirty-four courses are recorded for the academic year 1959-1960, with 1,521 participants and 1,487 clock hours total duration. Among the student categories were several physician groups, such as industrial, public health, and those in clinical practice. Nurses, health educators, sanitarians, nutritionists, social workers, and other categories of public health workers also comprised participant groups, and examples of more specialized groups are state dental directors and administrative personnel. Many of the subjects reviewed a broad field, presumably concentrating on recent dedevelopments and advanced technics, while others directed themselves to more specialized aspects, such as: public health nurse in a maternal health program; gerontology (for health educators); handicapping conditions in infancy; new developments in psychiatry (for health officers and nurses); and so forth.

The efforts of schools of public health to bring further knowledge to health workers already in the field should be commended, and steps to increase these activities should be supported in all respects. However, there is a question whether all 13 schools, even with an expanded program, could begin to meet the needs for continuation education among public health workers. Limitations of space prohibit an extensive discussion at this point, but it is not too soon for health agencies and personnel to begin to consider how and where this growing problem of continuation education for workers in public health may be met.

Comments

In the questionnaire returned by the 13 schools, an open-end question gave the deans and directors an opportunity to present outstanding needs, current development, and future plans. Only a few composites can be summarized here.

One of the outstanding problems, expressed by practically all, was that of space. The rapid growth of research activities and numbers of staff has led to crowded conditions in practically every school. While some are adding wings to existing structures, and one or two others are building or planning to build new quarters, no solution appears to be in sight for a few others. If, as one can hardly fail to agree, increases in student enrollments are indicated, then the problem becomes even more serious.

Several schools mentioned flexibility of curriculum and the development and expansion of teaching in new subjects, such as radiation health, chronic diseases, behavioral sciences, administrative medicine, and atmospheric pollution. The "state-owned," as contrasted to the "private," universities were a little more concerned with budgets, especially with reference to "hard money" and out-of-state students, though representatives from both categories mentioned problems in this regard. Several commented on responsibilities in the field of international health and special efforts they are undertaking vis-a-vis foreign students.

It is obvious that schools of public health now occupy an established place in the national educational picture. Although they do not have the long years of background experience of schools of medicine, dentistry, nursing, and others in the health field, schools of public health have made considerable progress in only a few decades of existence. As experience accumulates and as the institutions engage in more study and

analysis of their own activities, even greater steps forward may be anticipated.

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NOTE: The information presented here could not have been assembled without the cooperation of the several schools of public health. To the deans thereof and their staffs, the author expresses his grateful appreciation.

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APPENDIX A

(Revised 1955)

Criteria for Institutions to be Accredited for the Degree of Master of Public Health (Diploma of Public Health in Canada) and for the Degree of Doctor of Public Health*

Criteria for Both Degrees

The Institution

1. Any institution to be accredited must be a member of the Association of American Universities, or present evidence that it may reasonably be considered as qualified for such membership.
2. The school, faculty, or council administering courses in public health must have such practical autonomy that requirements for the degrees are effectively controlled by the public health faculty.
3. The teaching of public health must be under the direction of a full-time teaching faculty which must include, in addition to assistant professors and others of lower rank and in addition to part-time appointees:
   a. One member of professorial grade as director of the school or department, and at least three other members of professorial or associate professorial grade—all four primarily responsible to the administration of the school, and
   b. At least four other members of professorial or associate professorial grade, either primarily responsible to the school or giving full time to the university and carrying specific major responsibility for teaching and research in the school. Such a minimum faculty could provide for a body of graduate students in public health totalling not more than approximately thirty such students.
4. The school or department must have an assured minimum basic income adequate for its teaching and research functions and for meeting the various criteria outlined. Such income should be construed to include income from endowment of the school, contributions made from general university funds, and grants made over a period of at least five years from sources outside the university.
5. Proper housing must be available, including lecture rooms, seminar rooms, and adequate laboratory facilities for the teaching of subjects in the field of microbiology, including microscopes, culture media, apparatus, etc.; for the teaching of vital statistics, including calculating machines for student use, and apparatus for chart-making, with tabulating machinery accessible for demonstration purposes; and for the teaching of sanitary engineering, including laboratory facilities for the examination of water and sewage and for the demonstration of the basic principles of hydraulics.
6. Library facilities are essential to the extent of at least 3,000 volumes in the general field of public health, including such special topics as epidemiology, microbiology, vital statistics, sanitary engineering, medical economics and medical sociology, nutrition, and the like, and current periodicals (not including health department reports) to the number of at least 50 in the fields mentioned above.
7. There must be available conveniently

* Revision adopted by the Committee on Professional Education of the American Public Health Association, and approved by the Executive Board, November, 1948. Revised by the Committee and approved by the Board, November, 1955.

located administrative units of public health services which can be utilized for observation and criticism in the basic courses for the master of public health, and which are of sufficiently high quality to make such observation fruitful.

Criteria for the M.P.H. Degree

The Course

8. Candidates to be admitted for the degree of master of public health (diploma of public health in Canada) may be either:
   a. Holders of the degree of M.D., D.D.S., or D.V.M., or equivalent degree, from an acceptable institution; or
   b. Holders of the bachelor's degree with adequate preparation in the sciences basic to public health, and also qualified in some professional capacity to pursue education in public health.
   The latter qualifications may normally be fulfilled either by:
      x. Professional academic qualifications in engineering, public health nursing, education, or some other field of public health representing the equivalent of at least one year of academic work in addition to the completion of a four years' course leading to the bachelor's degree;
      y. Or experience (normally not less than three years) in some field of public health practice or in teaching of a type acceptable to the school.
9. The length of the course shall be not less than one academic year of 32 weeks.

It is highly desirable that the candidate shall have had practical public health experience in the form of supervised field service or in a position involving the exercise of substantial initiative and responsibility. This experience should preferably be obtained prior to entrance into the school. In some schools, candidates not so equipped on entrance are required to complete three months of practical work in the field before receiving their degree.

10. The following courses are among those generally offered in schools of public health:
    a. Public health practice (administration)
    b. Sanitation
    c. Microbiology
    d. Vital statistics
    e. Epidemiology
    f. Physiological hygiene
    g. Nutrition
    h. Public health nursing
    i. Health education
    j. Social and economic factors influencing health (economic factors in health)
    k. Mental hygiene
    l. Public health law
    m. Industrial hygiene
    n. School health
    o. Maternal and child health
    p. Tuberculosis
    q. Venereal disease
    r. Dental health
    s. Hospital administration

It is believed that it would be highly undesirable to make standard requirements with regard to any particular courses of instruction. It does seem important, however, that the student—at some point in the M.P.H. course, or prior to that course—shall receive instruction in the following basic fields:

A. Basic Public Health Sciences

(1) The nature and functioning of the human organism, and the personal behavior which influences its well-being, including nutrition and mental hygiene.

(2) The nature and behavior of various forms of parasitic life, including viruses; their interaction with the human body as demonstrated by clinical and immunological reactions; the modes in which such microorganisms are transferred from host to host in the course of their epidemiological history; and the ways in which such dissemination may be controlled.

(3) The physical environment as it influences health, including not only the classical problems of environmental sanitation, but also those relating to housing and industrial hygiene.

(4) The social and economic factors which influence the health of the individual and of the community, and the influences of sickness on the social and economic status of the individual and the community.

(5) The nature and sources of quantitative information bearing on the health of the people, and its numerical presentation and analysis.

B. Public Health Practices

(6) The principles of applying the basic sciences listed above to community health and welfare. This involves the elements of sound public administration as applied to official and voluntary health agencies, including office management, budget making, personnel relations, and public health law; and includes also the wide field of public relations as influenced by health education and community education.

11. There must be opportunity for advanced specialization in one or more of the fields listed under 10 above or in such special fields as tuberculosis control, venereal disease control, or tropical medicine. There will be little time available in the M.P.H. year for advanced specialization; but basic work can be conducted effectively only in an atmosphere of advanced scholarship and with the essential stimulus which comes from the conduct of productive research by the faculty and advanced students.

Criteria for the Dr.P.H. Degree

12. Candidates to be matriculated for the degree of Dr.P.H. must be persons of demonstrated ability and promise of leadership. They must normally hold a doctoral degree from an acceptable university; although in exceptional cases, candidates of unusual experience and attainment may be admitted without such a degree.
13. The candidate for the Dr.P.H. must complete—or must already have completed—basic courses equivalent to those required for the degree of M.P.H. by the university in which such student matriculates for the Dr.P.H.
14. The candidate, in addition to fulfilling criteria 12 and 13 must complete a minimum of one academic year of work in residence at the university involving advanced specialization in the particular area of public health for which the student is preparing. The total period of academic instruction in public health should be at least two years beyond that spent in acquiring previous doctoral degrees.
15. The candidate must demonstrate ability for leadership in his field, as well as for advancement of scientific knowledge. This must be indicated by successful professional experience in a post involving the exercise of substantial initiative and responsibility, preferably prior to admission.
16. The candidate must indicate capacity to make substantial contributions to the advancement of the science and art of public health by submitting a dissertation, *based on original research*, satisfactory to the authorities of the university.

APPENDIX B—Institutions Accredited by the American Public Health Association

Institution	Degrees for Which Accredited		
		Master's	
	Dr.P.H.	M.P.H.	Other (P.H.Ed.)
California, University of School of Public Health, Berkeley 4, Calif. C. E. Smith, M.D., Dean	X	X	—
California at Los Angeles, University of School of Public Health, Los Angeles 24, Calif. Lenor S. Goerke, M.D., Associate Dean	X	X	—
Columbia University School of Public Health and Administrative Medicine, New York 32, N. Y. Ray E. Trussell, M.D., Executive Officer	X	X	—
Harvard University School of Public Health, Boston 15, Mass. John C. Snyder, M.D., Dean	X	X	X
Johns Hopkins University School of Hygiene and Public Health, Baltimore 5, Md. E. L. Stebbins, M.D., Director	X	X	—
Michigan, University of School of Public Health, Ann Arbor, Mich. Myron E. Wegman, M.D., Dean	X	X	—
Minnesota, University of School of Public Health, Minneapolis 14, Minn. G. W. Anderson, M.D., Director	—	X	X
Montreal, University of School of Hygiene (Teaching in French), Montreal, Quebec, Canada Armand Frappier, M.D., Dean	—	X (D.P.H.)	—
North Carolina, University of School of Public Health, Chapel Hill, N. C. E. G. McGavran, M.D., Dean	X	X	X
Pittsburgh, University of Graduate School of Public Health, Pittsburgh 13, Pa. James A. Crabtree, M.D., Dean	X	X	—
Puerto Rico, University of Department of Preventive Medicine and Public Health, San Juan 22, Puerto Rico Nelson Biaggi, Ph.D., Acting Chairman	—	X	—
Toronto, University of School of Hygiene, Toronto 5, Ontario, Canada Andrew J. Rhodes, M.S., Director	—	X (D.P.H.)	—
Tulane University Medical School Division of Graduate Public Health, New Orleans 12, La. John C. S. Paterson, M.D., Director	X	X	—
Yale University Department of Public Health, New Haven, Conn. Anthony M.-M. Payne, M.D., Chairman	X	X	X

RESEARCH NEEDS IN SCHOOL HEALTH

COMMITTEE ON RESEARCH, SCHOOL HEALTH SECTION

AT THE 1958 Open Meeting of the Committee on Research, School Health Section, American Public Health Association, at St. Louis, Missouri, it was decided to revise the committee's 1957 report, "Research Needs in School Health." This has been one of the two projects pursued by the committee during the past year. A similar project had been carried out by the previous members of the Committee on Research in 1951. That report appeared in the 1951-1952 APHA Yearbook, pp. 133-138.

It was the general feeling of committee members that material of this nature must be periodically revised in order to reflect the now concepts, fresh facts, and improved investigational tools and technics developed through continued research and practice. In certain instances problems listed in previous reports have been solved. In some cases their significance has assumed larger proportions or, on the other hand, they may now be relegated to positions of minor importance in the broad scheme of school health research. Changing perspectives in school health programs and policies also tend to heighten the research potential of some problems and reduce the value of others.

It is recognized that some of the suggested studies have been done in the past. Where such problems continue to be cited, the committee feels that repetition might produce worthwhile data indicating significant changes that have taken place in recent years (e.g., textbook analysis, school health legislation, teacher preparation in health education, etc.). It is further appreciated that some of the problems posed will be difficult, if not impossible, to solve until valid and reliable methods of measurement are developed. Obviously, certain of the problems fall within the purview of simple surveyal study, while others will require the most carefully designed experimental approach. The answers to some problems can be easily and quickly determined. Others will not be solved without rather intensified multidisciplinary, longitudinal research conducted under conditions of rigid control.

It is the earnest hope of the committee membership that the following proposed problems may, through provocation and motivation of researchers, ultimately make some contribution to the health of America's school-age children and youth.

I. Health Instruction

1. What are the basic health education topics and concepts that should be included in the health curriculum at each grade level from one through 12?
2. To what extent can the following types of data be utilized in validating course content in health education: vital statistics, morbidity surveys, nutritional surveys, actuarial statistics, accident statistics (beyond the general data afforded by vital statistics), absenteeism records, findings of medical and dental examinations, teacher inspection, screening, and observation; and information on health interests, general attitudes, and practices?
3. What are the most effective technics for developing health knowledge, attitudes, and practices at the primary grade level? At the intermediate level? At the junior high school level? At the senior high school level? At the college level?
4. What is the relationship between health knowledge and health attitudes? Health knowledge and health practices? Health knowledge and health fads? Health attitudes and health behavior? Health knowledge and improve-

ment of physical and mental health status? Health education experiences (health courses) and health knowledge, attitudes, and behavior?

5. What motivational factors can be used to heighten the effectiveness of health instruction?
6. Are there significant differences in the health knowledge of high school freshmen and seniors? Health attitudes? Health practices? Health interests?
7. Are there significant differences in the development of knowledge, attitudes, and practices between pupils taught with a minimum emphasis and those taught with a maximum stress on human anatomy and physiology?
8. Why do pupils at the elementary-grade level like or dislike the study of healthful living? At the junior high school level? At the senior high school level? At the college level? What changes do they suggest?
9. Are there significant differences in the learning of basic health facts and principles between pupils taught by the direct method in separate health courses and those taught by means of correlated or integrated health instruction?
10. Are there significant differences in health knowledge (or practices or attitudes) between pupils in health classes where written objectives are prepared jointly by teachers and students and classes where this is not done?
11. To what extent should first aid be included in the course of study in health at the elementary level? At the junior high school level? At the senior high school level? At the college level?
12. To what extent should safety education be included in the course of study in health at the elementary level? At the junior high school level? At the senior high school level? At the college level?
13. What are the most common health and safety misconceptions of high school graduates? Of junior high school pupils? Of high school pupils? Of college students?
14. What are the major health interests of pupils in the primary grades? In the intermediate grades? In the junior high school? In the senior high school? In the college?
15. What factors in the school, home, and community significantly influence the health interests of pupils in the elementary school? In the junior high school? In the senior high school? In the college?
16. What are the most important health and safety needs of pupils in the primary grades? In the intermediate grades? In the junior high school? In the senior high school? In the college?
17. Are modern elementary health texts, or readers, comprehensive in scope and scientifically accurate? High school texts? College texts?
18. To what extent does use of an up-to-date health text influence learning as compared with groups taught without a text? What is the influence of a workbook?
19. Are there significant differences in the development of knowledge, attitudes, and practices of pupils in classes where selected health films are used and pupils in classes where films are not used?
20. What are the reading difficulty levels of modern elementary school health texts? High school texts? College texts?
21. What are the reader-interest levels of modern health texts? What specific influences do these variances have on learning?
22. What factors determine whether or not a pupil is interested in a health text? (e.g., vocabulary level, style of writing, typography, illustrations, color, difficulty level of concepts presented, content, and elements such as animal activities, action and movement, and surprise.)
23. What criteria are used by textbook committees, administrators, and teachers in selecting health texts for local or state adoption? Are there significant differences between practice and authoritative recommendations?
24. What standards should be used by teachers in selecting health pamphlets and other free and/or inexpensive materials?
25. What are the best sources of reliable, scientifically accurate, free, and inexpensive materials in health and safety?
26. What is the validity of health information and concepts presented to children and youths through public media (television, radio, newspapers, and magazines)?
27. What are the most frequently used scientific health terms in the English language? How are they defined? How well are they understood?
28. What health and safety problems are most frequently discussed in news items, health columns, and complete articles in daily newspapers and popular magazines? To what extent are they read?
29. How well can high school and college students read, understand, and interpret

health news items, health columns, and articles appearing in daily newspapers and popular magazines?

30. How well can high school graduates make a critical analysis of health advertisements? Are there significant differences between graduates who have had a course in health and those who have not?
31. What significant differences in health behavior are there between high school graduates who have had a health course and those who have not? Do comparative data change with the passing of time? (I.e., what are the differences one year after graduation? Five years? Ten years?)
32. What are the values and limitations of standardized health tests (knowledge, attitudes, and practices) as a means of measuring pupil status and progress? Health tests prepared by the teachers?
33. What kinds of learning outcomes (knowledge, attitudes, practices, and interests) are the most valid bases for assessing pupil achievement in elementary-school-health instruction? In junior high school classes? In senior high school classes? In college health classes?
34. In what areas of health teaching should guidance or pupil behavior be equivocal in light of inadequacy of scientific data?
35. How effective are films in improving teaching and learning in such difficult areas as sex education, alcoholism, family life education, and emotional health?
36. How effectively are tables, charts, graphs, and other health text illustrations used by pupils and teachers?
37. To what extent are bibliographic references, questions, problems, and other chapter-end material in health texts used by high school and college students?
38. What are the employment possibilities for undergraduate health education majors?
39. What are the basic science and health education requirements for physical education majors throughout the nation? Biology majors? Home economics majors? General science majors? Social science majors? Elementary majors?
40. What are the most effective ways to recruit superior young men and women for careers as school health educators? What are the major blocks in such a recruitment program? How may they be removed?
41. To what extent does health education in the school influence the knowledge, attitudes, and practices of parents in the home?
42. What are the current health instruction laws in the 50 states in terms of time allotment, grade placement, topics to be covered, teacher certification, and related factors.
43. What concepts in family life education should be taught in the primary and intermediate grades of the elementary school?
44. What concepts in alcohol education should be taught in intermediate elementary grades and the junior high school?
45. How effective is learning in health courses taught via television? On the elementary level? Secondary level? College level?
46. How well does our present motivational procedures in health education take into consideration changing human values?
47. How can sociological and cultural changes be implemented in course objectives and teaching procedures?
48. What impact has television viewing (both commercials and regular programs) had upon the student's interest in his health?

II. Health Services and Guidance

1. What factors influence the attitudes of pupils at various grade levels toward the school medical examination? Are there significant differences in attitude toward examinations given at a physician's office and those given at the school?
2. What general minimal standards can be recommended for rural schools with limited health services, personnel, and facilities?
3. To what extent does the routine school medical examination carry over as a sound health practice throughout life?
4. Is the medical examination by the private family physician more effective, in terms of health guidance and follow-up, than that conducted at the school?
5. Are the results of the medical examination and the follow-up more effective when the pupils have been oriented in the classroom to the purpose and nature of the examination than when no preparation has preceded it?
6. Is there a significant difference in the relationship of young adults to the family physician when they have assumed responsibility for their own college entrance medical examination as compared with when they were examined by physicians of the college health service?
7. What are the current practices with regard to teacher certification and/or con-

tract requirements for periodic health examinations, chest x-ray or tuberculin testing, and other health services for school personnel?

8. What is the best schedule for giving health examinations to pupils in elementary school? In the secondary school? In the college?
9. What are the attitudes of children at various grade levels toward having parents present at the school medical examination? What are the attitudes of parents?
10. How much time is specifically devoted to health counseling during the school medical examination?
11. Is the time and effort expended in the health examination and screening of school children and youth justifiable in terms of the achieved results, especially the correction of defects?
12. How effective are volunteers as testers in the hearing and vision screening of pupils?
13. How effective is the follow-up program on weight problems detected in the height-weight screening of pupils?
14. What psychological tests are most suitable, in terms of validity, reliability, objectivity, and practicability, for use in screening school children and youth for mental and emotional problems?
15. To what extent should schools use psychological screening tests when a school psychologist and/or psychiatrist are available?
16. What are the most critical years for screening for defects of vision and hearing?
17. What is the most suitable instrument or method, in terms of validity, reliability, objectivity, and practicability, for use in assessing the physical growth of school children? How often should measures of height and weight of pupils be taken in elementary school? In high school? In college? To what extent are the NEA-AMA Physical Growth Records used in schools?
18. What methods are most effective in providing for emotionally disturbed children and youth through pupil personnel, school health, and special education staffs?
19. What is the attitude of parents, teachers, and pupils toward the addition of a psychologist and/or psychiatrist to the school health team?
20. To what extent is school health counseling included as a part of the professional curricula for teacher education?
21. What is the status of professional preparation of nurses and physicians for the special roles they may assume in school health services?
22. What provision is made in the professional preparation of guidance specialists for an orientation to the school health service program?
23. How can student teachers obtain actual training in health observation of pupils and orientation to school health service programs?
24. What provision is made for the in-service education of school personnel in regard to emergency procedures, including first aid and civil defense?
25. What measures will favorably influence public understanding and appreciation of the educational aspects of school health services?
26. What are the specific factors (e.g., over-referrals, notification forms, health records, parent-teacher and/or parent-nurse conferences, and the like) that influence the attitudes of parents and pupils toward the health service program?
27. How can the cooperative relationship of school health services and community health resources be made more effective for improving follow-up procedures?
28. Is group counseling of pupils with the same health defects (e.g., vision, hearing, acne, weight problems, and the like) more effective than individual counseling in achieving remedial action?
29. What are the best methods and technics for coordinating guidance counseling, health counseling, health instruction in the classroom, and school health services?
30. How can the school health service program be most effectively utilized to contribute to classroom teaching in health?
31. What is the current practice in schools with regard to the transfer of the cumulative health records from grade to grade and from school to school?
32. Are there significant differences in knowledge, attitudes, and practices with regard to immunization between pupils who have regularly participated in mass inoculation programs in schools and colleges and those who have not?
33. Are existing practices in school health services consistent with the specific educational goals stated?
34. To what extent are the health needs of the pupil being met by (1) the home, (2) the school, and (3) the community?
35. What is the current practice and policy in new school construction with regard

to provision for a health service unit (e.g., allotted space, facilities provided, location, provision for boys and girls, and the like)?

36. What differences exist in the knowledge and attitudes of parents with regard to school health services as compared with health instruction and the school's physical and emotional environment?
37. What technics will ensure a better relationship between teachers, pupils, parents, nurses, dentists, physicians, and other health specialists in the follow-up of pupil health problems?
38. What is the role of the nurse in the school health program? Which activities are relatively unproductive? Which procedures could be carried out at lower per unit costs?
39. How can the procedures and technics of school health service personnel be evaluated in terms of their effect on knowledge, attitudes, practices, and health status of pupils?
40. What basic guides can be followed in establishing a plan for providing prompt and qualified emergency services in cases of injury or sudden illness among pupils? What first-aid policies and practices are most desirable and effective?
41. How effective is teacher observation in the selection of pupils with health problems as compared with selection by the school nurse?
42. What is the per pupil expenditure for school health services in schools where there is an adequate follow-up program as compared with schools with ineffective follow-up service?

III. Healthful School Living

1. What effect in terms of fatigue and efficiency may be attributed to changing the length and schedule of the school day? (Many schools have found it necessary to hold elementary classes on a half-day basis because of overcrowded facilities.)
2. What are the most significant factors to consider when classroom environmental characteristics are weighed? What is the rank order of importance of these factors from the standpoint of pupils, teachers, administrators, and architects?
3. What are the optimum temperature and humidity conditions for health and alertness in the different school activities? Are there different requirements for art or music classes than there would be for an arithmetic class?
4. What is the present status of new school buildings as to physical items such as classroom ventilation, heating, light, acoustics, etc? What would a survey reveal if conducted on buildings up to three years old? Ten years old?
5. To what extent are school accidents directly related to the physical living conditions of the school? For example, defective lighting can be directly related to accidents in the shops or laboratories. How much of this exists?
6. Are there more school accidents in and about the small rural schools, as compared with the large city or central schools? What are the causal factors involved?
7. To what extent does classroom efficiency relate to total physical fitness?
8. What is the relationship of teaching method to pupil fatigue?
9. What is the relationship of the teacher's health status to pupil success in school? What is the current health status of teachers?
10. Do sounds of certain frequencies and intensities disturb classroom performance by contributing to physical and psychological inefficiency?
11. What foods are typically included in school lunches available in elementary schools? In secondary schools?
12. What are the dietary practices of elementary children eating lunch at the school? Of secondary pupils?
13. What health problems are associated with school physical education and athletics?
14. What differences exist in physical and emotional fitness between elementary pupils participating in physical education and pupils who do not have a planned program for motor learning?
15. What characteristics of mental health and physical health are utilized in selecting prospective teachers in teacher education institutions?
16. What traits or activities of teachers significantly influence the emotional health of pupils in elementary and/or secondary schools?
17. What is the effect of teacher-administrator relations on the emotional health of pupils?
18. What are the influences of school and class size on the emotional health of pupils?
19. What is the extent of emotional problems among pupils in the primary grades, in-

termediate grades, junior high school, senior high school, and college? What factors in home, school, and community contribute to these problems? What are the appropriate functions of the school in prevention, case-finding, and treatment?

20. What relationship exists between teaching method (e.g., formal teaching versus group discussion) and emotional health of pupils?
21. What relationship exists between school marking systems and the mental-emotional health of pupils?
22. What classroom factors influence the incidence and spread of respiratory infections among pupils?
23. What are optimum conditions for classroom lighting to ensure efficiency and prevent eye and general fatigue?
24. Are there significant differences in the incidence of playground injuries suffered by elementary pupils supervised by classroom teachers and those supervised by physical education specialists?
25. What classroom activities in elementary and secondary schools are most often associated with pupil accidents?
26. What relationship exists between school bus travel time, including waiting before or after classes, and fatigue problems among pupils?
27. What influence does classroom furniture have upon pupil posture, body mechanics, and efficiency?
28. What is the proportion of elementary, junior high, and senior high schools throughout the country utilizing automatic fire alarm and sprinkler systems?
29. How can posture be validly appraised while the pupil is seated at a desk-chair combination suited to his body size?
30. What is the effect of supplementary feeding of one-half pint of milk to elementary school children? To secondary school youth? To college students?
31. What is the effect of food supplements (e.g., vitamins, minerals, amino acids) administered under medical supervision on the health and fitness of school children and youth?
32. What are the usual practices of the college health program with respect to medical examinations; tuberculin testing; screening for vision, hearing, and posture; serologic tests; health councils, dental health, and other aspects of student staff health?
33. What is the effect of homogeneous versus heterogeneous grouping, or assignment to special classes, upon individual pupil mental health?
34. What is the impact of social promotion upon the emotional health and social adjustment of the pupil?
35. To what extent do the human relations and behavior guidance units already included in the curriculum affect pupil attitudes and behavior? What further content from the behavioral sciences should be integrated into the school curriculum?
36. What are the major factors affecting teacher morale and mental health?

IV. Organizing and Administering School Health Programs

1. Are there significant differences between the attitudes of school administrators, public health officers, public health nurses, and teachers toward the various forms of administering school health services under (a) board of education control, (b) department of health control, and joint control?
2. Are there significant differences in the correction of defects in pupil health between the several plans for administering school health services?
3. How can the administrative authority of boards of education and departments of health be most effectively coordinated in the provision of school health services? How can the cost of these services be equitably defrayed?
4. What are the most effective procedures for achieving increased support and understanding of the school health program by the local medical and dental societies and health department?
5. What are the most effective technics for informing the public of the need for more adequate health services, health instruction, and a healthful and safe environment for school-age children and youth?
6. What health services do children and youth need most at preschool, primary grade, intermediate grade, junior high, senior high, and college-age levels?
7. How can communications between treatment agencies and school health services be improved?
8. What information should be included in manuals designed for professional personnel describing the organization, administration, and functions of a school health program?
9. What should be the relationship of the school physician to health teaching in elementary and secondary schools?

10. How can the private medical practitioner be best oriented to the actual school and classroom situation as it affects the health of school pupils?
11. How can the training of school physicians be improved with regard to background in public health, school health, and the community approach to health problems of the school-age child?
12. What is the frequency of use and relative importance of data included in typical cumulative health record forms currently used?
13. What administrative and supervisory procedures may be employed to minimize time and effort and increase the effectiveness of maintaining and using school health records?
14. What is the most desirable and effective administrative pattern for student health services in colleges and universities?
15. What adjustments are needed in teacher and school nurse work loads to facilitate the nurse-teacher conferences and improve health counseling of pupils and parents?
16. What are the functions of the school health coordinator, or supervisor, in terms of frequency and relative importance? What implications do these activities have for preparatory programs?
17. Which curricular pattern (e.g., subject-in-isolation, core, broad fields, common-activities-of-living) is best suited for optimally effective health instruction?
18. What measures are effective in promoting cooperative relationships between and among school boards, health departments, zoning boards, citizens' groups, and other local organizations in selecting and maintaining a safe and healthful school site?
19. How can medical supervision be provided for school athletic competition in small communities where the scarcity of physicians and the exigencies of their practice create special problems? How can medical consultant services best be provided for all pupils in these rural areas?
20. What are the most desirable types and levels of accidental injury insurance for students engaged in athletic contests?
21. What in-service education in school health should be provided for teachers, principals, curriculum coordinators, practicing physicians and dentists, and public health and school nurses?
22. What are the basic policies and requirements for administering school health programs as shown by the legal requirements of each of the 50 states?
23. What significant differences exist between the membership, purposes, and procedures of school health councils in rural communities, small cities, suburban areas, and large cities?
24. What is the past training and current requirements in school health for school administrators? How do these factors compare with current authoritative recommendations?

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(A list of Sources of Selected Information on Research Relating to School Health follows on pages 1799-1806.)

SOURCES OF SELECTED INFORMATION ON RESEARCH RELATING TO SCHOOL HEALTH

Name of Service or Publication	Frequency	Type of Presentation	Coverage	Source of Further Information
Accident Facts	Annually	Charts, illustrations, and graphs	Statistical view of all types of accidents; research on school accidents, etc.	National Safety Council 425 N. Michigan Avenue, Chicago, Ill.
American Journal of Nursing	Monthly	Bibliographies, book reviews	Scientific studies in nursing	National League for Nursing 2 Park Avenue, New York 19, N. Y.
American Journal of Public Health and The Nation's Health	Monthly, special supplements, and annual index	Bibliographic and abstract data	Research completed and in progress in field of public health	American Public Health Association 1790 Broadway, New York 19, N. Y.
Bibliography of Medical Reviews	Annually	Listings	Medical and related fields	U. S. Department of Health, Education, and Welfare, Public Health Service, Vol. 3, 1958
Bibliography of Space Medicine	Single report	Reference information annotated bibliography	Aviation medicine and aerophysiology	U. S. Department of Health, Education, and Welfare, Public Health Service Washington 25, D. C.
Bio Sciences Information Exchange	Sent on request	Abstracts	Medicine, nursing, public health, nutrition, psychology, education, anthropology, mental health, and intercultural relations	Smithsonian Institute 1113 Dupont Circle Building Washington 6, D. C.
Borden's Review of Nutrition Research	Bimonthly	Reviews and summaries of research	Nutrition and foods	The Borden Company, Editorial Office 350 Madison Avenue, New York 17, N. Y.
Central Index of Research on the Deaf, A	Bimonthly	Abstracts	Social, economic, and psychological aspects of deafness	Dr. Anders Lunde Gallaudet College, Washington 2, D. C.

Name of Service or Publication	Frequency	Type of Presentation	Coverage	Source of Further Information
California Journal of Educational Research	Five times a year	Bibliographies, book reviews	Education, including curriculum, guidance, evaluation, supervision, and finance	California Teachers Association 693 Sutter Street, San Francisco, Calif.
Child Development	Quarterly	Abstract section	Child growth and development	Society for Research in Child Development, Inc. Purdue University, Lafayette, Ind.
Child Development Abstracts and Bibliography	Quarterly	Abstracts and bibliography	Growth and development of children and youth	Child Development Publications Society for Research in Child Development, Inc. Purdue University, Lafayette, Ind.
Children	Bimonthly	Book reviews, bibliographies	Child health, growth and development, and education	Children's Bureau, U. S. Department of Health, Education, and Welfare Washington 25, D. C.
Classified List of Current Periodicals in the Felds of Athletics, Health, Physical Education, and Sports	Quarterly	Manuscripts, listings	Health, physical education, recreation, and safety	The Physical Educator, March, 1956, Vol. XIII, No. 1, and May, 1956, Vol. XIII, No. 2
Compilation of Research in California in Health, Physical Education, Recreation, Camping, and Outdoor Education	No. 56 (1953 through 1956) March, 1957 No. 56, July, 1957	Bibliography	Health education, physical education, recreation, and related fields	California State Department of Education, Bureau of Health Education, Physical Education and Recreation Sacramento, Calif.
Dental Abstracts	Monthly with annual index in December	Abstracts	Selection from the world's dental literature, grouped in broad classifications, e.g., periodontics, physiology, education, therapeutics, oral surgery, prosthetic dentistry, orthodontics, etc.	American Dental Association, Bureau of Library and Indexing Service 222 E. Superior Street, Chicago 11, Ill.

Dissertations and Masters' Theses Completed at Ohio State University during the Academic Year	Mimeographed annually	Bibliography	Health education, physical education, recreation, and related fields	Chairman of Graduate Division Department of Physical Education, Men's Gymnasium Ohio State University, Columbus 10, Ohio
Educational Research Service Circular	Annually	Annotated bibliography of questionnaire studies	Education, including school health	American Association of School Administrators and Research Division of the National Education Association 1201 16th Street, N. W., Washington 6, D. C.
Excerpta Medica	Monthly	Abstract service covering the world's periodical medical literature	Consists of 20 separate periodicals—one for each classification including various diseases and conditions. Sec. XVII, Public Health Social Medicine and Hygiene. . . Sec. VII Pediatrics	Excerpta Medica Foundation Peter A. Warren, Director New York Academy of Medicine Building 2 East 103 Street, New York 29, N. Y.
Food and Nutrition News	Monthly	Reviews of research	Nutrition and diet	National Live Stock and Meat Board 407 South Dearborn Street, Chicago 5, Ill.
Government Sponsored and Government Supported Research: Social Sciences and Interdisciplinary Areas	Annually	Listings	Extramural government sponsored research relating to the social sciences (e.g., anthropology, economics, political science sociology, social psychology, statistics)	National Science Foundation Division of Social Sciences 1951 Constitution Ave., N. W., Washington, D. C.
Government Sponsored Research Projects in Psychology, Psychiatry, and Closely Related Areas	Annually	Listings by area within the field of psychology (Part I); listings by geographical area (Part II)	Extramural government sponsored research projects, in colleges and universities not carrying security classification, in psychology, psychiatry, and related fields	Psychobiological Program, Biological and Medical Sciences Division, National Science Foundation 1951 Constitution Avenue, N. W., Washington, D. C.

Name of Service or Publication	Frequency	Type of Presentation	Coverage	Source of Further Information
Grants and Fellowships Awarded by the National Institutes of Health	Annually	Alphabetical listings	National Institutes of Health research facilities grants, fellowships and research project grants; listed by state and institution	National Institutes of Health Public Health Service, U. S. Department of Health, Education, and Welfare Washington 25, D. C.
Health Education: A Selected Bibliography (Second Edition)	Periodically	Bibliography	Health education; anthropology, and sociology related to health programs; methods of technics in health education	UNESCO Publications Center 152 W. 42nd Street, New York 36, N. Y.
Health and Physical Education Microcards	Periodically	Microcards of unpublished doctoral dissertations and masters' theses	Health education, physical education, physiology of exercise, recreation and camping, and psychology	Microcard Publications School of Health and Physical Education University of Oregon, Eugene, Ore.
Illuminating Engineering	Monthly	Abstracts, bibliographies, and index	Research on school lighting	Illuminating Engineering Society 1860 Broadway, New York 19, N. Y.
An Inventory of Social and Economic Research in Health	Annually since 1952	Bibliographic, and abstract data; indexed by sponsor, investigator, and type	Includes statement of problem and summary of project with identifying data, if further information is desired	Health Information Foundation 420 Lexington Avenue, New York 17, N. Y.
Journal of the American Dental Association	Monthly	Abstracts, bibliography, book reviews, charts, illustrations, and index	Research on dental health problems	American Dental Association 212 E. Superior Street, Chicago 11, Ill.
Journal of The American Dietetic Association	Monthly	Bibliographic and abstract data, book reviews, charts, and index	Investigations of nutritional problems for all age groups	American Dietetic Association 620 Michigan Avenue, North, Chicago 11, Ill.

Journal of The American Home Economics Association	Monthly	Abstracts, bibliography, index, illustrations, and charts	Dietary studies of school-age children	American Home Economics Association Mills Building, 17th Street and Pennsylvania Avenue, Washington, D. C.
Journal of the American Medical Association	Weekly	Abstracts, book reviews, bibliographies, and index	Research on health problems of all ages	American Medical Association 535 North Dearborn Street, Chicago, Ill.
Journal of the American Medical Association	Weekly with annual index	Bibliographic and abstract data	Research in progress and recently completed	American Medical Association 535 North Dearborn Street, Chicago 10, Ill.
Journal of Education	Quarterly	Research reviews and reports	Education, including health education (Vol. 141, No. 4, April, 1959)	Boston University School of Education 332 Bay State Road, Boston 15, Mass.
Journal of Experimental Education	Periodically	Bibliographies, charts, and statistical data	Child development, curriculum, learning, teaching, supervision, measurement, and statistical and experimental technic	Demar Publications, Inc. Madison 3, Wis.
Journal of School Health	Monthly, except July and August	Summaries, progress reports, and bibliographic and abstract data	Studies and research in school health activities	American School Health Association The Editor, 337 West 17th Avenue, Columbus 10, Ohio
National Education Association Research Bulletin	Four times a year	Research reports, charts, and index	Educational research, school health programs. Primary source of information on salaries, retirement systems, school finance trends, and pupil-teacher-personnel (some related to school health). Highlights, most major studies conducted by National Education Association, Division of Research	National Education Association 1201 16th Street, N. W., Washington 6, D. C.

Name of Service or Publication	Frequency	Type of Presentation	Coverage	Source of Further Information
Nutrition Abstracts and Reviews	Quarterly	Abstracts and reviews	Nutrition and dietetics	Rowett Research Institute Buckburn Aberdeenshire, Scotland
Nutrition Committee News	Bimonthly	Research reviews	Nutrition education and school lunch programs	Institute of Home Economics Agricultural Research Service U. S. Department of Agriculture, Washington 25, D. C.
Nutrition News	Four times a year	Book reviews, illustrations, abstracts	Dietary studies	National Dairy Council 111 North Canal Street, Chicago 6, Ill.
Nutrition and Health	Ten times a year	Abstracts of nutrition research		Editor, Nutrition News Service E. I. du Pont de Nemours Company, Inc., Wilmington 98, Del.
Pediatrics	Monthly	Abstract sections	Pediatrics and related fields (e.g., nutrition, surgery, dentistry, public health, human genetics, psychology, phychiatry, education, sociology, and nursing	American Academy of Pediatrics Dr. Charles D. May, Editor University Hospital, Iowa City, Iowa
Physiological Abstracts	Bimonthly	Bibliographic and abstract data	General; physiological psychology; receptive and perceptual processes; response processes; complex processes and organization; developmental psychology; guidance; counseling; behavior deviation; educational psychology; personnel psychology; industrial and other applications	American Psychological Association 1333 16th Street, N. W., Washington 6, D. C.

Physiological Abstracts	Bimonthly	Abstracts, index, microfilm, microcards	General psychology and related fields	American Psychological Association 1333 16th Street, N. W., Washington 6, D. C. Order microfilms from: University Microfilms, Inc. 313 North First Street, Ann Arbor, Mich. Order microcards from: J. S. Canner & Company, Inc. 618 Parker Street, Roxbury 20, Mass.
Rehabilitation Literature	Monthly	Abstracting bulletin service; summaries	Summaries of papers pertinent to the field of chemistry; five decennial indexes include summaries of its reports during the respective 10-year period	National Society for Crippled Children and Adults 2023 W. Ogden Avenue, Chicago 12, Ill.
Report on Questionnaires	About twice a month	Listing and brief descriptions of questionnaire studies	Education, including school health	American Council on Education Office of Statistical Information and Research 1785 Massachusetts Avenue, N. W., Washington 6, D. C.
Research Quarterly	Quarterly	Abstract section	School health, physiology, psychology, and physical fitness	American Association for Health, Physical Education and Recreation 1201 16th Street, N. W., Washington 6, D. C.
Research Relating to Children	Twice annually	Abstracts	Child health and safety, growth and development, and learning	Children's Bureau, Division of Research Washington 25, D. C.
Research Relating to Children	Periodically and specified periods; December, 1948, to July, 1958	Bibliographic and abstract data	Research related to growth and development, personality, intelligence, education, health, and social services	Social Security Administration U. S. Department of Health, Education, and Welfare Washington 25, D. C.

Name of Service or Publication	Frequency	Type of Presentation	Coverage	Source of Further Information
Research Studies in Education—1957	Annually	Index and bibliography doctoral dissertations, reports and field studies, and research methods sources	Education, including school health	Phi Delta Kappa, Inc. Eighth and Union Avenue, Bloomington, Ind.
Second Annual Bibliography of Completed Research in Health, Physical Education and Recreation	Annually	Bibliography	Health education, physical education, physiology, kinesiology, psychology, and recreation	Research Council of AAHPER 1201 16th Street, N. W., Washington 6, D. C.
School Health Services	One-shot analysis for 30-year period	Review of research	How well does the school health program meet the needs of United States children—an examination of 1,000 studies	Social Security Administration Children's Bureau U. S. Department of Health, Education, and Welfare Washington 25, D. C.
Science Information Service	On request	Translation of technical scientific information from foreign languages to English language; index on unpublished scientific data	Effective dissemination of scientific information to organizations and investigators; research and development data on methods and equipment for automatic processing of scientific information	National Science Foundation 1951 Constitution Ave., N. W., Washington, D. C.
Sociological Abstracts	Quarterly	Abstracts, index	General sociology and related fields	Leo P. Chall 225 West 86th Street, New York 24, N. Y.
Sources of Morbidity Data	Annually	Project listings by subject matter	Current morbidity statistics projects	U. S. Department of Health, Education, and Welfare, Public Health Service Washington 25, D. C.
Tuberculosis Abstracts	Monthly	Abstracts and reports	All phases of tuberculosis research	National Tuberculosis Association 1790 Broadway, New York 19, N. Y.

ASSOCIATION NEWS

Miss Sheahan—The New President

MARION W. SHEAHAN, R.N.

Marion W. Sheahan, R.N., deputy general director, National League for Nursing, assumed office as president of the American Public Health Association for 1960-1961 at the 88th Annual Meeting in San Francisco, Calif. She is the third woman and the first nurse in its history to lead the Association.

A native of the Empire State, Miss Sheahan had her professional preparation for nursing in Albany at St. Peter's Hospital School of Nursing. Close upon her graduation, she joined the staff of the Henry Street Settlement in New York City, drawn there by her quickening interest in public health nursing. Her career led her soon to the City Health Department of Albany, from there to Niagara County, N. Y., as tuberculosis nurse, then on to the Bureau of Public Health Nursing of the New York State Department of Health. There she was made assistant director and in 1932 director, a position she held until 1948. Throughout this period she pioneered new methods of public health nursing that set a pattern for many states throughout the nation.

During the academic year 1948-1949 the University of California, Berkeley, called upon Miss Sheahan's services as a teacher, naming her visiting professor of nursing. But the East Coast reclaimed her as an administrator in 1949 when she was appointed director of programs with the National Committee for Improvement of Nursing Services, one of the parent organizations of the National League for Nursing. When NLN was formed in 1951 she was appointed director of the Division of Nursing Services, subsequently becoming deputy general director.

Miss Sheahan's advice and counsel are sought by a variety of organizations on the national scene. She is a member of the Public Health Service's National Advisory Committee on Public Health Training, nurse representative in the Special Medical Advisory Group to the Veterans Administration, and nurse consultant to the Army Nurse Corps. She is also a consultant to the Professional Advisory Council of the National Society for Crippled Children and Adults and serves on the Board of Directors of the National Citizens Committee for the World Health Organization. Her work in the past on behalf of the community and the profession has found her on the President's Commission on the Health Needs of the Nation, the Surgeon General's Consultant Group on Medical Education, and the Executive Committee of the National Social Welfare Assembly. During World War II she was chairman of the National Advisory Committee of the American Red Cross and chairman

of the National Nursing Planning Committee which formulated "A Comprehensive Program for Nationwide Action in the Field of Nursing." From 1947 to 1949 she was president of the National Organization for Public Health Nursing, another of the parent groups of the National League for Nursing.

Among the recent written works with which Miss Sheahan is closely associated are "Nursing Schools at the Mid-Century," a report prepared under the auspices of the National Committee for the Improvement of Nursing Services in 1950, and "Nurses for a Growing Nation," a report of the Committee on the Future, National League for Nursing, in 1957.

Paralleling Miss Sheahan's years of professional service to the community have been her years of active service to the profession of public health through the APHA. A member since 1931 and a Fellow since 1933, she became vice-chairman of the Public Health Nursing Section in 1939 and chairman in 1940. She has served one term (1945-1946) as a vice-president of the APHA and two terms (1955-1957 and 1957-1960) as a member of the Executive Board.

Miss Sheahan has been actively involved in the work of many APHA Association and Standing Committees. For example, in the Forties she served for several years on the Committee on Administrative Practice, and in the Fifties (1950-1954) on the Lasker Awards Committee. Miss Sheahan has also been a member of the Sedgwick Memorial Award Committee.

Her close identification with the development, progress, and destinies of the growing nursing profession resulted in a Lasker Award for Miss Sheahan in 1949. APHA in its citation paid "tribute to a rare blend of talents" in her person. "Nursing service, the field of public health, and particularly public health nursing have assumed a new and broader stature because of Miss Sheahan's inspiring leadership, skills and unswerving devotion to her 'visions of a better world.'"

The new president's leadership in the field has been officially recognized by many organizations. In 1954 Miss Sheahan became the third person to receive the Hermann M. Biggs Award of the New York State Public Health Association. Skidmore College gave her a citation in 1956. In 1957, she received the Florence Nightingale Medal of the International Conference of Red Cross Societies. She has the honorary degree of Doctor of Humanities from Adelphi College, New York.

Miss Sheahan in private life is Mrs. Frank W. Bailey, and makes her home in New York City where she was born. However, she is a New Englander at heart when it comes to leisure. This she spends doing gardening on her farm in Vermont, and with the fruits of her labor, pursuing the gastronomic muse. It is that countryside, too, that helps keep her interest kindled in the ways and needs of people in a rural community, so often the forgotten men when the benefits of public health practice are being passed around.

Sedgwick Memorial Medal for 1960

FRED T. FOARD, M.D.

It is a privilege, indeed, to represent the APHA in its bestowal of the Sedgwick Memorial Medal for the year 1960, upon Fred T. Foard, M.D., a true pioneer in expanding the frontiers of public health.

Son of a distinguished North Carolina country practitioner, Dr. Fred T. Foard was graduated in 1916 from the University of Maryland School of Medicine. Following internship at the U. S. Public Health Service Hospital, Boston, he joined, and served with, the U. S. Public Health Service until 1952. After three years of epidemiological work in typhoid fever and malaria control about World War I military camps and at other areas in the South, he was assigned to Montana as the first full-time U. S. Public Health Service officer for development of local health departments in the western states. Beginning in 1920, Dr. Foard began his long career (1920-1947) in the pioneering establishment, organization, and development of local health departments in each of the Pacific and mountain states, and in Hawaii and Alaska. He was also instrumental in bringing about reorganization of three state health departments from a part-time to full-time basis. The impact of his work with state health departments was perhaps most strongly felt in Colorado, where working in an advisory capacity with Dr. Florence Sabin, a complete reorganization of state and local health service was brought about.

In the early Forties he assisted in rallying western support leading to the establishment of the School of Public Health, University of California, at Berkeley. Throughout World War II, Dr. Foard was area director of the Medical Division of the Office of Civil Defense Mobilization for the Pacific Coast and Rocky Mountain states.

After a regional directorship in Puerto Rico—Virgin Islands 1947-1948, Dr. Foard dedicated his last four years with the PHS to those changes responsible for lasting improvement in the health of American Indians and native Alaskans. Aside from primary responsibility for obtaining an increasing year-to-year federal appropriation for Indian health services from nine to about 20 million dollars between 1947 and 1952, Dr. Foard devoted his energy to laying groundwork for transfer of all health, medical care, and hospital activities of the Bureau of Indian Affairs from the Department of Interior to the PHS.

Before submitting the transfer proposal to the Congress, Dr. Foard, with the assistance of Dr. A. J. Chesley, sought and obtained the transfer en-

The citation was read by J. W. R. Norton, M.D., State Board of Health, Raleigh, N. C., on behalf of Thomas F. Sellers, M.D., formerly state health officer of Georgia, now retired.

dorsement from the Association of State and Territorial Health Officers, the American Public Health Association, the National Tuberculosis Association, the state boards of health of a large majority of the "Indian states," the American Medical Association, the Association on American Indian Affairs, and the principal tribal councils of many Indians. He continues to serve as an advisor on Indian health to the Surgeon General, and has just returned from a study of Indian health affairs in Alaska.

Since 1952, Dr. Foard has served as director of the Division of Epidemiology of the North Carolina State Board of Health. Here he continues as an inspiring stimulus to his associates, to attract others to the public health field, to improve the status of public health workers, and, thereby, to improve the quality of state and local health practice.

Dr. Foard assisted in the organization of the Western Branch of the American Public Health Association, is an honorary life member of that Association, an honorary life member of the Idaho Public Health Association and a former vice-president of the American Public Health Association. Other organizations of which he is a member and in which he has been active are: North Carolina Public Health Association and State Medical Society, American Medical Association, American College of Preventive Medicine, and American Association of Public Health Physicians.

Our Association honors this day a great man. Here in the West where his accomplishments may be seen on all sides it is especially fitting that his leadership and his contributions thus be acknowledged with this token of our gratitude—The Sedgwick Memorial Medal.

Response by Dr. Foard

Although it was never my privilege to know Professor Sedgwick in person, nevertheless to be the 1960 recipient of the award that is given annually by this Association in his name is a signal honor which I deeply appreciate and which I accept only on a sharing basis for the many associates with whom I have worked in public health through many years. It also causes me to feel humble to join my able predecessors who have received the Sedgwick Medal for their distinguished work in public health.

Professor Sedgwick was the public health leader of his day. His teachings have been widely followed by the public health workers of the nation. He was one of the first to put into effect, among other advancements, trained medical personnel to be engaged in public health. This later led to special training for physicians, nurses, engineers, sanitarians, laboratory technicians, and others—as workers in the field of public health. His early recommendations have expanded throughout the years until today there is no state and few leading counties or cities in the nation that do not have a corps of workers who are devoting their full time to the prevention of disease and the promotion of the public health. In this connection, I had the happy privilege of joining many others in sponsorship of the School of Public Health in this state.

From the very early nineteen twenties, it was my privilege to participate in the development of some of the early full-time county health departments in the far western states and to assist in the development of a few state health departments from poorly organized part-time departments to organizations with trained full-time directors and assisting personnel. Whatever success was obtained during those early organization

years was due to teamwork with my associates who were also working in the western area. I especially should like to mention the late Dr. Platt W. Covington who represented the Rockefeller Foundation in the western states at that time, and Dr. William P. Shepard, who was then the field representative of the Metropolitan Life Insurance Company in the western area.

Perhaps special reference should be made to two other specific subjects considered and mentioned by Dr. Norton in his citation covering the 1960 Sedgwick Award—that of work with the American Indians and the natives of Alaska.

I would be remiss without crediting those to whom credit is due in the improvement of health services for the American Indians, who until a few years ago were virtually a forgotten racial group. Since 1849 until July 1, 1955, providing both preventive and curative health services for Indians was a responsibility of the U. S. Department of the Interior. At no time since before the turn of the century did the Congress make available to the Department of Interior sufficient funds to provide adequately these services, yet our federal government—at least health-wise—was responsible for Indians from the time of birth until death. Several early attempts made in the Congress failed to have the Indian Health Service transferred from the Department of Interior, a nonmedical governmental agency, to the U. S. Public Health Service, an agency much better equipped for providing both preventive and curative health services. These attempts failed through lack of public support.

As a result of an educational program started in late 1949, endorsements for the transfer to the U. S. Public Health Service and for greater appropriations for Indian health services were received by 1952 from organizations that had become actively interested in better health for the American Indians. I mention a few of them: The American Public Health Association, of which Dr. William P. Shepard of the Metropolitan Life Insurance Company was president in 1951; the National Tuberculosis Association, of which Dr. James E. Perkins was and still is managing director; the American Medical Association, of which Dr. John W. Cline of San Francisco was president in 1951; the Congress of American Indians, which included most tribes of Indians of the northwestern states; the Association on American Indian Affairs (New York City); the Chippewa Tribe of Indians of Minnesota; and numerous state boards of health of states having Indian reservations.

Of great importance and assistance to the movement, I should like particularly to mention the late Dr. Albert J. Chesley, at that time State Health officer of Minnesota and formerly president of this Association. With great interest in the improvement in Indian health facilities over a period of many years, Dr. Chesley worked untiringly for the transfer. With the endorsement of the above-mentioned great national organizations, Dr. Chesley had little trouble in inducing the Honorable Walter H. Judd of the House of Representatives to sponsor the legislation with the Honorable Edward J. Thye as the cosponsor.

In 1954, the transfer legislation became law, to become effective on July 1, 1955. Since that time, great improvement has been made in Indian health under the immediate direction of Assistant Surgeon General James R. Shaw and a competent and adequate staff of professional and other personnel.

It is with all of the above-mentioned organizations and individuals in mind, together with the many others who have been associates or coworkers throughout my period of more than 40 years in public health work that I most gratefully accept this award.

NEWS OF AFFILIATED SOCIETIES AND BRANCHES

APHA Affiliated Societies and Branches

Society and Secretary

ALABAMA PUBLIC HEALTH ASSOCIATION, Ralph Roberts, State Health Dept., Montgomery
ARIZONA PUBLIC HEALTH ASSOCIATION, Joseph J. Weinstein, Maricopa County Health Dept., Phoenix
ARKANSAS PUBLIC HEALTH ASSOCIATION, Mrs. Vada Russell, State Health Dept. Bldg., Little Rock
CALIFORNIA, NORTHERN PUBLIC HEALTH ASSOCIATION, Mrs. Joan Davis, City Health Dept., San Jose
CALIFORNIA, SOUTHERN, PUBLIC HEALTH ASSOCIATION, Dorothea Hansen, City Health Dept., Los Angeles 12
COLORADO PUBLIC HEALTH ASSOCIATION, Alice de Bruyn Kops, 4660 S. Delaware, Englewood
CONNECTICUT PUBLIC HEALTH ASSOCIATION, Shirley Thayer, R.N., 61 Arnold Way, West Hartford 7
CUBAN PUBLIC HEALTH SOCIETY, Dr. Raphael Calvo Fonseca, Calle 19 No. 511 Altos Vedado, Havana
FLORIDA PUBLIC HEALTH ASSOCIATION, Everett H. Williams, Jr., P. O. Box 210, Jacksonville
GEORGIA PUBLIC HEALTH ASSOCIATION, Mrs. Martha Power, State Health Dept., Atlanta 3
HAWAII PUBLIC HEALTH ASSOCIATION, Alison MacBride, R.N., 510 S. Beretania St., Honolulu 13
IDAHO PUBLIC HEALTH ASSOCIATION, Ralph Carpenter, 120 N. Capitol Blvd., Boise
ILLINOIS PUBLIC HEALTH ASSOCIATION, William J. Hixon, Evanston Health Dept., Evanston
INDIANA PUBLIC HEALTH ASSOCIATION, Malcolm J. McLelland, State Board of Health, Indianapolis
IOWA PUBLIC HEALTH ASSOCIATION, Lloyd Coe, Iowa Hospital Association, 1012 Liberty Bldg., Des Moines
KANSAS PUBLIC HEALTH ASSOCIATION, W. W. Wilmore, Kansas Tuberculosis and Health Assn., 1134 Topeka Ave., Topeka
KENTUCKY PUBLIC HEALTH ASSOCIATION, Miss Peggy Fisher, 275 E. Main St., Frankfort
LOUISIANA PUBLIC HEALTH ASSOCIATION, A. G. Owens, P. O. Box 1872, Monroe
MARYLAND PUBLIC HEALTH ASSOCIATION, C. Murray Wylie, M.D., 615 North Wolfe St., Baltimore 5, Md.
MASSACHUSETTS PUBLIC HEALTH ASSOCIATION, Mrs. Elizabeth K. Caso, Dept. of Health, Cambridge
MICHIGAN PUBLIC HEALTH ASSOCIATION, Howard Hilton, Washtenaw County Health Dept., County Bldg., Ann Arbor
MINNESOTA PUBLIC HEALTH ASSOCIATION, D. S. Fleming, M.D., State Dept. of Health, University Campus, Minneapolis
MISSISSIPPI PUBLIC HEALTH ASSOCIATION, H. E. Boone, P. O. Box 1700, Jackson
MISSOURI PUBLIC HEALTH ASSOCIATION, Mrs. Nadia Craver, 5th Fl., State Office Bldg., Jefferson City
MONTANA PUBLIC HEALTH ASSOCIATION, Thomas S. Willett, Montana Public Health District 1, Hardin
NEBRASKA PUBLIC HEALTH ASSOCIATION, Mrs. Jack Carey, Lincoln Dairy Council, 620 Sharp Bldg., Lincoln, Neb.
NEW JERSEY PUBLIC HEALTH ASSOCIATION, Waldo McNutt, M.P.H., Delaware River Drive, Frenchtown
NEW MEXICO PUBLIC HEALTH ASSOCIATION, Daniel T. Marley, P. O. Box 8066, Albuquerque
NEW YORK CITY, PUBLIC HEALTH ASSOCIATION OF, Frances Ann McVey, 4317 Robinson St., Flushing 55, N. Y.
NEW YORK STATE PUBLIC HEALTH ASSOCIATION, Carline Millican, Rochester Regional Office, State Health Dept., Rochester
NORTH CAROLINA PUBLIC HEALTH ASSOCIATION, Robert W. Brown, Box 7525, Asheville
NORTH DAKOTA PUBLIC HEALTH ASSOCIATION, Alice H. Peterson, M.D., State Dept. of Health, Bismarck
OHIO PUBLIC HEALTH ASSOCIATION, Mrs. June O'Donnell, 3516 Braddock St., Dayton
OKLAHOMA PUBLIC HEALTH ASSOCIATION, Bill Burk, 3400 North Eastern, Oklahoma City
OREGON PUBLIC HEALTH ASSOCIATION, Muriel David, City Bureau of Health, 203 N.E. 28th Ave., Portland
PENNSYLVANIA PUBLIC HEALTH ASSOCIATION, Emma J. Petach, R.N., 324 N. Second St., Harrisburg
PUERTO RICO PUBLIC HEALTH ASSOCIATION, Mrs. Mae de Acin, Apartado 211, San Juan 2
SOUTH CAROLINA PUBLIC HEALTH ASSOCIATION, Emily Anne Easterling, Richmond County Health Dept., Columbia
SOUTH DAKOTA PUBLIC HEALTH ASSOCIATION, Alice Brady, R.N., State Dept. of Health, Pierre
TENNESSEE PUBLIC HEALTH ASSOCIATION, C. B. Tucker, M.D., State Dept. of Health, 420 Sixth Ave., N., Nashville
TEXAS PUBLIC HEALTH ASSOCIATION, Joseph N. Murphy, Jr., State Dept. of Health, Austin
UTAH PUBLIC HEALTH ASSOCIATION, Katherine Brandon, M.D., P. O. Box 25, Foothill Station, Salt Lake City
VIRGINIA PUBLIC HEALTH ASSOCIATION, Robert M. Parker, 401 Colley Ave., Norfolk 7
WASHINGTON STATE PUBLIC HEALTH ASSOCIATION, Vance McCallister, 1509 Public Safety Bldg., Seattle 4, Wash.
WEST VIRGINIA PUBLIC HEALTH ASSOCIATION, Mrs. Katherine L. Brown, State Dept. of Health, Charleston 5
WISCONSIN ASSOCIATION FOR PUBLIC HEALTH, Paul Weis, RR No. 2, Waunakee
MIDDLE STATES BRANCH, APHA, Thelma Luther, Dept. of Health, Des Moines, Iowa
SOUTHERN BRANCH, APHA, M. L. McDonald, Dallas Health Museum, Dallas, Tex.
WESTERN BRANCH, APHA, Robert G. Beaumier, 1309 Smith Tower, Seattle, Wash.

North Carolina: Across the Board

The North Carolina Public Health Association met for its 49th annual session in Durham, September 7-9, drawing 717 delegates to its meeting chambers. The scope of its discussions was considerable, the 1960 conference theme being "Public Health Across the Board: Programs, Problems, Profession."

Addressing the topic of programs, i.e., "Some Emotional Impediments to Public Health Programs," was Marvin E. Perkins, M.D., director, New York City Community Mental Health Board, principal speaker at the first general session. Some of the impediments, he said, are the result of public health's being "seized and enthralled" by many forces. One is a scientific heritage which tends to make public health workers rely

too much on the ways and means of the past. A specialist heritage results in workers tending to isolate themselves in practice rather than to blend their talents with others into interdisciplinary attacks on diseases. One effect of a mass production heritage is that public health workers may try to "sell" public health, a product- rather than a consumer-centered activity. "If the railroad industry had been transportation-oriented, rather than railroad-oriented, they might not be in difficulty today," he said.

The second general session was on problems, namely "Problems We Face in North Carolina and the Role of Public Health." The Honorable Terry Sanford, Democratic candidate for Governor, set these forth. "We must fulfill the slogan that North Carolina is a place where the weak grow strong, and the strong grow great," he said. "We have come a long way from the economic and political devastation of the Civil War, and we are only now in a position to begin moving in on the problems of the diseases that have ravaged this area for the last hundred years and more. . . . It is your job to show us what needs to be done now, and to plan, not for the next few years, but for ten, and beyond that to the time that disease can be eradicated."

In his address at this session, Fred G. Pegg, M.D., NCPHA president, and director, Forsyth County Health Department, Winston-Salem, said that the "greatest need" for public health workers today is to have definite goals. He pointed to some past goals in a review of the accomplishments of pioneers in the public health movement in this country and the state. In the first decade of this century, he said, "Every imaginable disease known in this county was prevalent and uncontrolled in this state. In a time that knew no miracle drugs or large treatment centers, the public health services spread enlightenment, fought to remedy living conditions causing the disease, and earned the confidence of the people."

Delegates attending the third general session saw a Parade of Discplines showing "Our Profession and the Future." Displayed on a map of North Carolina were individual signs showing the number of present employees, by professional category, in the official health agencies in the state. Representatives of each discipline took turns in placing figures on adjacent signs indicating the projected need for personnel in each category by 1980. (For example, 264 health educators will be needed in contrast to the present 15.) A panel of consultants then joined these representatives in a discussion of implications and the steps that must be taken to recruit this number of workers. Among the suggestions: get more career brochures to guidance centers and to high schools. J. W. R. Norton, M.D., state health director, introduced the session.

The awards banquet was the setting for the final general session. Edward G. McGavran, M.D., dean, University of North Carolina School of Public Health, presented the awards.

Jacob Koomen, Jr., M.D., assistant director of the Division of Epidemiology at the State Board of Health, received the Carl V. Reynolds award for his contributions in the fight against communicable diseases in the state. Robert W. Brown of the Buncombe County Board of Health, was named "Sanitarian of the Year." The Soroptimist Club and the Senior Woman's Club in Hendersonville were honored for outstanding mobilization of civic clubs and private citizens in the interest of public health, having raised $80,000 toward the construction of Henderson County's new health center. Ruth Gordon Hay was honored as outstanding public health nurse of the year. NCPHA's annual scholarship award went to Maude K. Eaker, a student at the University of

North Carolina School of Public Health. Receiving awards for 25 years of public service were: Mmes. Erroll Moore, secretary (now retired), Halifax County; Hannah H. Brown, nurse, Pitt County; Carrie Cooper, nurse, Durham County; Ruby Reister, nurse, Buncombe County; Sophronia Wilkerson, nurse, Robeson County; and Miss Hazeline D. Umstead, secretary, Durham County.

Papers at the meeting of the eight sections of NCPHA were also "across the board." Among the topics: Time and Cost Studies of Nursing; Epidemiological Trends in Public Health; Nutrition in Chronic Disease; the Private Physician and Infectious Syphilis; and Radiation Control on Local and State Levels.

Noteworthy in its association news this year, NCPHA has added two new sections, Mental Health and Venereal Disease, bringing the number of sections up to ten. Also two branches of NCPHA have been formed, the eastern and western. NCPHA now has 1,234 members, 170 of whom are active members. ("Members" belong to NCPHA only; "active members" are members or Fellows of APHA in addition. Only active members can hold office.) NCPHA officers for 1960-1961 are:

President—Grace H. Daniel, consultant in health education, State Board of Health, Salisbury

President-Elect—Benjamin M. Drake, M.D., M.P.H., director, Gaston County Health Department, Gastonia

Treasurer—Corrina S. Sutton, M.P.H., Laboratory of Hygiene, State Board of Health, Raleigh

Secretary—Robert W. Brown, sanitarian, Buncombe County Health Department, Asheville

Representative to Governing Council, APHA —Robert F. Young, M.D., M.P.H., health officer, Halifax County Health Department, Halifax

The North Carolina Academy of Preventive Medicine and Public Health held its annual meeting in conjunction with NCPHA's. Robert E. Coker, Jr., M.D., research professor, School of Public Health, University of North Carolina, and director of the APHA project at UNC presided at the two sessions. At both of these Harold A. Graning, M.D., medical director, Region II, Public Health Service, New York City, was principal speaker. His topics were "Management and Administration in Public Health" and "The Reorganization of the Public Health Service and Its Implications for Public Health in the United States."

New Jersey: Eastern Encephalitis

One of the first activities of the New Jersey Public Health Association was the organizing and convening of an all-day conference in Princeton (January, 1960) to discuss the recent equine encephalitis outbreak in the state and the preventive measures planned for the future. In 1959, 33 human cases of Eastern encephalitis were reported in New Jersey. Twenty-one of these cases resulted in death and most of those who survived are reported to have suffered severe brain damage. Speakers at the conference included local health officers, practicing physicians, public health nurses, representatives of departments of agriculture, and staff members of mosquito control commissions. The proceedings of the conference are presented in the April, 1960, issue of Public Health News, the monthly periodical of the New Jersey State Department of Health. Copies available from the State Department of Health, Trenton, N. J.

Massachusetts: Public Viewpoints

Papers on "Community Attitudes About Health" claimed the attention of delegates attending the annual fall meeting of the Massachusetts Public Health Association (Sept. 15, Amherst). At the opening session the following

social scientists and public health administrators reported on studies of these attitudes: Irwin T. Sanders, Ph.D., chairman, Department of Sociology, Boston University—how to obtain a social profile of a community; Sol Levine, Ph.D., assistant professor of social psychology, Harvard School of Public Health—how we learn about all the interaction that goes on among agencies and the barriers to cooperation; Jerry A. Solon, director, Medical Care Studies Unit, Beth Israel Hospital, Boston—utilization of social services by private patients; Dorrian Apple, Ph.D., assistant professor of sociology, Boston University—two nonmedical criteria in deciding whether a health problem is an "illness" (1) recency of onset, (2) interference with usual activities; Leon J. Taubenhaus, M.D., director, Health Department, Brookline—factors influencing the utilization of community services by the older age group; Harry T. Phillips, M.D., director, Health Department, Newton—attitudes of school physicians toward change; and Leon Sternfeld, M.D., commissioner, Health Department, Cambridge—establishing a community research laboratory.

Among the eight afternoon sessions of MPHA Sections, MCH presented a case of a crippled child, showing full use of local resources in a rural area. The Dental Health Section examined "A Case Study—A Community Dental Health Program." The presentation was distributed to delegates in advance of the meeting. Medical Care—the New England regional membership of APHA's Section—conducted a panel on some major problems in providing care for the aged, e.g., relationships to the philosophy and practices of the Social Security program, and the role of the practicing physician. Alfred L. Frechette, M.D., and Patrick A. Tompkins, state commissioners, respectively, of health and welfare; Lawrence R. Dame, M.D., immediate past-president of the State Medical Society; and Dean A. Clark, M.D., general director, Massachusetts General Hospital, were the panel, moderated by Philip D. Bonnet, M.D., administrator, Massachusetts Memorial Hospitals.

The evening session was a panel discussion on "Local Level Relationships—Town Counsels and Boards of Health." This was the first of a series of meetings which will bring together different groups with whom Boards of Health plan, confer, and work.

The annual Lemuel Shattuck Award was presented to Herbert L. Lombard, M.D., M.P.H., recently retired as director of the Division of Cancer and Chronic Disease, Massachusetts Department of Public Health.

The 1960 Paul Revere Award, newly created to recognize meritorious service in public health at the local level, went to John D. Crowley, executive agent, Cambridge Department of Public Health, citing his 48 years of active, energetic, enthusiastic work in a growing health department.

Dean A. Clark, M.D., was outgoing president. Officers for 1960-1961 are:

President—Leon Sternfeld, M.D., health commissioner, Cambridge

President-Elect—William H. Weidman, M.D., director, Division of Tuberculosis Control, Massachusetts Department of Public Health

Vice-President—Marjorie A. C. Young, Dr.P.H., instructor in health education, Harvard School of Public Health, Boston

Secretary—Janet E. Packard, nutritionist, Beth Israel Hospital, Boston

Treasurer—Jack Kasten, M.P.H., assistant director, Jewish Memorial Hospital, Roxbury

(NOTE: MPHA issues a mimeographed annual report. The one for 1959-1960 is ten pages and devoted to a review of over-all activities, relations with other organizations, special projects, standing committees, and sections. Among the "High Spots, 1959-1960": Increased section activity: continuing education projects; self-evaluation; survey of needs; strengthening of ties with public health, co-sponsorship of an Institute on Public Health and the Behavioral Sciences; increase in membership; one new Section, Epidemiology, and a petition for the formation of a Medical Care Section.)

New Mexico: Push and Cooperate

The annual meeting business session of the New Mexico Public Health Association (April 22, 1960) heard reports that 142 individuals paid membership dues in 1959; that materials have been prepared for junior high schools, high schools, and colleges throughout the state by the Health Careers Committee; and that the Legisaltive Committee was most successful in its work in the last legislature. Resolutions on milk sanitation and control, and on cigarette smoking and teen-agers were among those passed.

Velma Long, chairman of the Awards Committee presented distinguished service awards to the Dona Ana County Gray Ladies, Las Cruces Red Cross Chapter; to Helen Feldkamp of Santa Fe; Peter O. Griego, R.S., senior sanitarian of Albuquerque; Helen O'Brien, public health nurse of Las Vegas; and to Milton Zises, M.D., of Santa Fe. The Distinguished Service Plaque in recognition for continuous distinguished public health service in New Mexico for over five years went to David F. Striffler, D.D.S., M.P.H., director, Dental Health Division, State Health Department and secretary, Dental Health Section, APHA.

In her comments as incoming president, Velma Long said that, "Members of our five sections have an unequaled potential of strength to make things happen in public health. Through activities of our section chairmen and Special Committees, we should re-inforce and help develop more effective programs in our official and volunteer or nonofficial agencies. We are resources to these agencies—Helpers—Pushers and Cooperators." The 1960-1961 directory of officers is:

President—Velma Long, public health nursing consultant, New Mexico Department of Public Health, Santa Fe
President-Elect—John Allanson, New Mexico Department of Public Health, Santa Fe
Vice-President—Lena Pruette, Department of Public Health, Health District No. 6, Carlsbad
Secretary—Daniel T. Marley, Albuquerque
Representative to Governing Council, APHA—Larry J. Gordon, M.P.H., director of health, Albuquerque Health Department

APHA membership application blank on page XXXVII

Journals Wanted

If there are any readers who have no further need of their February or, March, 1960, Journals, the Association would be grateful if members would mail them to the Association at 1790 Broadway, New York 19, N. Y. Issues of January and February, 1959, are also much needed.

EMPLOYMENT SERVICE

The following pages present information for those seeking public health personnel and for those seeking positions in public health. Other information concerning vacancies and personnel available is on file in the Association office. Anyone wishing to have the benefit of this additional information can obtain it by writing to the Vocational Counseling and Placement Service of the Association.

Advertising space in these pages is available at special rates for the use of employers or individuals. The charges are $5 for the first 50 words or fraction thereof and $1 for each additional 10 words or fraction thereof. There is no charge to members or Fellows of the Association who desire to utilize the **Positions Wanted** portion of these pages. **Closing date** for receipt of advertisements is the first of the month preceding the desired month of publication. **All correspondence should be sent to the American Public Health Association, 1790 Broadway, New York 19, N. Y.**

POSITIONS AVAILABLE

Director, Division of Public Health—Department of Health and Welfare, Alaska. Develop and administer a state-wide coordinated program of public health. Minimum qualifications: M.P.H. or its equivalent from an approved school of public health, and five years' experience in public health administration in an official health agency. Entrance salary $1,355 per month. Write to Paul L. Winsor, Commissioner, Department of Health and Welfare, Alaska Office Bldg., Juneau, Alaska.

Health Officer—for Mesa County Health Department. Starting salary $12,000 per year. This is an established health unit with headquarters in Grand Junction, Colo. Please contact Dalton Roberts, Administrative Officer, Colorado State Department of Public Health, 4210 E. 11th Ave., Denver, Colo.

Psychiatrist—to act as director of the Community Mental Health Services program. Starting salary up to $1,244 per month depending upon qualifications of applicant. Contact Dalton Roberts, Administrative Officer, Colorado State Department of Public Health, 4210 E. 11th Ave., Denver, Colo.

Public Health Officer—eligible for American Board certification, to head well established department, Jefferson County, foothills of Rockies and part of Denver metropolitan area. Ideal location, rapidly growing county, progressive government. Population 127,000; 1960 budget $184,800; 1961 proposed budget $231,500. New building to be completed in 1961. Starting salary $12,876, with average annual increments, $650. Starting date July 1, 1961. Write Director, Jefferson County Health Department, Court House, Golden, Colo.

Chief, Section of Hospitals—A key position in the department, involving supervision of licensure programs of general hospitals, chronic and convalescent hospitals (nursing homes), and state-level administration of the Federal Hospital Survey and Construction Act. Staff includes trained engineer and experienced inspectors. Requires eligibility for Connecticut medical licensure and five years' training and/or experience in hospital administration. Write B. Dearington, Personnel Administrator, Connecticut Department of Health, State Office Bldg., Hartford, Conn.

Medical Health Officer—with M.P.H. and eligibility for licensure in Illinois. New bi-county health department to begin operations at once. In the heart of the recreation area of southern Illinois; population approximately 100,000. Beginning salary $15,000-$18,000, plus travel. Opportunity to develop department and program. Southern Illinois University in adjacent county. Write Louis Helleny, Secretary, Board of Health, Herrin, Ill.

County Public Health Officer—Shasta County in northern California. M.D. and either M.P.H. degree or two years' experience in public health required. California physician's license required within one year. For full particulars write Bill G. Minton, County Executive, Shasta County Court House, Redding, Calif.

Local Health Officer—Immediate opening for full-time director for the tricounty health unit located at the eastern tip of the upper peninsula of Michigan. Salary $12,000 for M.P.H. degree and two years' public health experience. Excellent personnel policy. Apply: Dr. D. V. DuVall, Chippewa-Luce-Mackinac Health Unit, Sault Ste. Marie, Mich.

Director—for progressive and well established County Health Department serving a rich agricultural-industrial area in southeastern Michigan; population 76,000. Eligibility for Michigan licensure, training and experience in public health required. Address: Lenawee County Health Department, 113 West Front St., Adrian, Mich.

Public Health Director—for Public Health Department in Portland, Maine, community of 80,000 and center of metropolitan area of about 150,000. Department staff of 37 engaged in progressive public health program, including active housing inspection and enforcement of minimum housing standards and environmental sanitation. Council-manager form of government since 1923. Health department enjoys excellent relationships with private and voluntary agencies, and a real civic interest in public health matters exists. Health department budget for 1960 totals $160,000. Portland offers an unparalleled opportunity for constructive professional work and for pleasant living. Degree in medicine required. Degree in public health or willingness to obtain graduate training in the field is desired. Salary open. Write Julian H. Orr, City Manager, City Hall, Portland, Maine.

Public Health Physician—to head well established, efficiently functioning County Health Department. Starting salary $13,000-$15,000 depending upon previous training and experience. State qualifications, experience, and expected compensation. Eaton County Health Department, Box 190, Charlotte, Mich.

Epidemiologists or Other Public Health Physicians—interested in clinical practice. For expanding decentralized program of all-purpose medical group in rural area. Academic environment and benefits program. Qualifications: eligibility for New York license, and preferably board-eligible in internal or preventive medicine. Rip Van Winkle Clinic, Hudson, N. Y.

County Health Commissioner — for Dutchess County, N. Y. Salary $14,000-$15,000. Applicants shall be licensed or eligible for examination to practice medicine in New York State. Other qualifications: not less than two years' full-time experience in general public health work and completion of a course in public health of at least one scholastic year in residence. Excellent personnel policies. Write Dr. John F. Rogers, 96A South Hamilton St., Poughkeepsie, N. Y.

Pediatrician—for State Health Department. To act as pediatric consultant within the agency and work with professional and lay groups in the field. Included in work: hospital standards, school health problems, statistical studies, future program planning. Starting salary $12,240. Ohio medical license, one-year internship, at least two years' graduate training required; preferably Board of Pediatrics or eligible. Civil service position, vacation, sick leave, annual salary increments, and retirement plan. Staff appointment to state university if eligible. Address inquiries to Division of Child Hygiene, Ohio Department of Health, Columbus 15, Ohio.

Health Officer—Starting salary $12,600-$15,000 depending on qualifications. Jackson County, Medford, Ore., in the heart of the beautiful Rogue River Valley, about equal distance from Portland and San Francisco. M.D. and M.P.H. degrees, plus some public health administrative experience. Ability to secure medical licensure in Oregon under the merit system. Apply to Mr. A. T. Johnson, Personnel Director, Oregon State Board of Health, P. O. Box 231, Portland 7, Ore.

Health Officers—Three excellent openings for local health officers. Salary range $12,120-$15,480; board certified $12,960-$16,320. **Epidemiologist-V.D. Control** opening. State Health Department, salary range $12,840-$14,340; board certified $13,320-$14,880. Starting salaries open, depending on qualifications. All positions require M.P.H. degree and some public health experience. For full particulars write Mr. A. T. Johnson, Personnel Director, Oregon State Board of Health, P. O. Box 231, Portland 7, Ore.

Chief, Division of Local Health Services—Washington State Department of Health. Salary range $15,540-$18,348 per annum. M.D., M.P.H., and four years' experience as head of an official full-time health department or equivalent. Eligibility for state license required. Inquire: Personnel Officer, 1309 Smith Tower, Seattle 4, Wash.

District Health Officer—for Grays Harbor County, Wash. Salary range $12,456-$14,868. M.D., M.P.H., and two years' public health experience or residency training, or three years' general medical experience. Eligibility for state license required. Inquire: Personnel Officer, State Health Department, Smith Tower, Seattle 4, Wash.

District Health Officer—Public health administrator of a district area; district epidemiologist. Plan, organize, supervise work of professional staff consisting of engineers, nurses, sanitarians, nutritionists, dental hygienists, health educators, and social workers. Requires M.D. and M.P.H. degrees and license to practice medicine in Wisconsin. Salary: beginning level $12,048-$15,048 per year based upon number of years of residency training and certification by the American Board of Preventive Medicine. Maximum salary, $16,848 per year. Civil service, vacation, sick leave, Social Security, retirement, group health and life insurance benefits, travel allowance. For applications and further information write R. J. Siesen, Personnel Officer, State Board of Health, State Office Bldg., Madison 2, Wis.

Director, Local Health Services—Work with district health officers and professional staff in improvement of local health services. Act as liaison between district and central office staff. Requires M.D. and M.P.H. de-

grees, two years' residency, certification by the American Board of Preventive Medicine, and license to practice medicine in Wisconsin. Beginning salary $16,248 per year; maximum salary $18,048 per year. Civil service, vacation, sick leave, Social Security, retirement, group health and life insurance benefits, travel allowance. For applications and further information write R. J. Siesen, Personnel Officer, State Board of Health, State Office Bldg., Madison 2, Wis.

Director, Bureau of Maternal and Child Health—Plans and directs a state-wide program for the conservation and improvement of maternal and child health; coordinates and supervises the activities of the bureau. Major activities include the child guidance, school health, and nutrition programs. Requires M.D. and M.P.H. degrees, certification by the American Board of Preventive Medicine or Pediatrics, preferably the latter, and license to practice medicine in Wisconsin. Beginning salary $18,648 per year; maximum salary $20,448 per year. Civil service, vacation, sick leave, Social Security, retirement, group health and life insurance benefits, travel allowance. For applications and further information write R. J. Siesen, Personnel Officer, State Board of Health, State Office Bldg., Madison 2, Wis.

Assistant Director, Public Health Nursing—Seeking experienced, creative PHN to develop and implement training program in progressive public health setting in beautiful Fresno, cultural center of San Joaquin Valley (134,000 city, 360,000 county population), midway between San Francisco and Los Angeles, near mountains and ocean. Salary $5,036-$7,548. Requires master's degree in nursing administration, supervision, or consultation from a university program approved by NLN, or M.P.H. from university program approved by the APHA, and four years' progressively responsible PHN experience, two in a supervisory capacity. Must have valid California PHN certificate or obtain same during probationary period. Apply by December 2, 1960, to Edward W. Firby, Director of Personnel, Fresno County Civil Service, Room 101, Hall of Records, Fresno, Calif.

Public Health Nurse—Immediate openings in generalized health program in beautiful, smog-free Fresno. Metropolitan hub of San Joaquin Valley. Close to three national parks, two colleges, and other cultural advantages. Salary $4,836-$6,036. Requires California registered nurse license and California public health nurse certificate. Appointments will be made pending issuance of aforementioned license and certificate. Civil service positions, but examination not required. Apply immediately to Fresno County Civil Service Office, Room 101, Hall of Records, Fresno 21, Calif.

Public Health Nurse—for rural area, to do generalized work, including school nursing. Good location. Must be eligible for California certificate. Beginning salary $415. Write R. L. Hull, M.D., San Benito County Health Department, Hollister, Calif.

Public Health Nurse II—Staff position for qualified public health nurse in a generalized, progressive program. Appointments are made through the Florida Merit System. Beginning salary for a staff position is $315 a month, with increments to $400. Other benefits include state retirement, Social Security, vacation and sick leave, and optional participation in group life and hospitalization plan. For further information write to Director of Nurses, Palm Beach County Health Department, P. O. Box 29, West Palm Beach, Fla.

Maternal and Child Health Nursing Consultant—Immediate vacancy with the State of Hawaii Health Department, Bureau of Maternal and Child Health. Requires five years' nursing experience, of which three years must have been in public health nursing and involving one year of teaching or supervisory responsibility; graduation from nursing school and college; completion of a college program in public health nursing and graduate study in obstetrical and/or pediatric nursing. Appointments may be made at any salary step between $6,156 and $7,860 per annum. Continuous recruitment until need is met. Contact the following for application and further information: Recruiting and Examining Division, Department of Personnel Services, State of Hawaii, 825 Mililani St., Honolulu 13, Hawaii.

Assistant Supervisor, Nursing Services—for Missouri Crippled Children's Service. Salary $5,436-$6,948. Write Merit System Supervisor, Student Health Center, 2nd Floor, University of Missouri, Columbia, Mo.

Public Health Nurses—for generalized public health nursing in the New Mexico Department of Public Health. Opportunities for advancement, retirement plan, and other fringe benefits. Write Merit System Director, 136 W. Palace, Santa Fe, N. M.

Public Health Nurse—Cincinnati Health Department. Generalized program. P.H.N. I: R.N., no experience; $4,214. P.H.N. II: R.N., B.S.; $4,355. Retirement plan, accumulative sick leave, paid vacation, other fringe benefits. Apply Catherine E. Ludlow, R.N., Superintendent of Public Health Nurses, Room 238, City Hall, Cincinnati 2, Ohio.

Consultant-Public Health Nurse—A creative, imaginative person with a master's degree and progressive public health nursing experience is being sought by the Division of Public Health Nursing, Public Health Services of Philadelphia, to work in a newly created posi-

PENNSYLVANIA DEPARTMENT OF HEALTH

Public Health Opportunities in Pennsylvania

REGIONAL MEDICAL DIRECTOR—$13,301-$16,978

Public Health Physician II—to develop and administer a comprehensive program of public health services in a region of several counties with headquarters in Reading. The Reading region has been approved by the American Medical Association for a residency program for public health physicians. Requirements: certification by the American Board of Preventive Medicine and Public Health, five years' experience in public health administration, and eligibility for licensure in Pennsylvania.

DIRECTOR, DIVISION OF BEHAVIORAL PROBLEMS—$13,301-$16,978

Public Health Physician II—in the Division of Behavioral Problems, to coordinate and administer a state-wide program in the care and prevention of alcoholic and narcotic addiction. Requirements: five years of professional training and experience in the field of behavioral problems, including certification by the appropriate medical specialty board, and eligibility for licensure in Pennsylvania.

ASSISTANT REGIONAL MEDICAL DIRECTOR—$12,675-$15,387

Public Health Physician I (General)—to assist the regional medical director in administering a comprehensive program of public health services in a region of several counties. Requirements: four years of professional training and experience in public health, including certification by the appropriate medical specialty board, and eligibility for licensure in Pennsylvania.

CHIEF, SCHOOL HEALTH SECTION—$12,675-$15,387

Public Health Physician I (Pediatrics)—in the Division of Maternal and Child Health, to coordinate and administer a state-wide public health program for children of school age. Requirement: certification by the American Board of Pediatrics.

CHIEF, EPIDEMIOLOGY SECTION—$12,675-$15,387

Public Health Physician I (Epidemiology)—in the Division of Communicable Diseases, to coordinate and administer a state-wide public health program of communicable disease control. Requirements: four years of training and experience in the field of specialization, including certification by the appropriate medical specialty board, and eligibility for licensure in Pennsylvania.

PHYSICIANS FOR TUBERCULOSIS HOSPITALS

Tuberculosis Physician I—$9,923-$12,675. To perform general duty in the medical and surgical care of tuberculosis patients in a state tuberculosis hospital. Requirement: two years' experience, including one year of specific experience in the diagnosis and treatment of pulmonary and chest diseases.

Tuberculosis Physician II — $10,954-$13,979. To assist in the administration of medical activities of a tuberculosis hospital. Requirements: three years' specific experience in the diagnosis and treatment of pulmonary and chest diseases, including one year in the medical service department of a hospital, and certification by the American Board of Internal Medicine.

All positions under the merit system; real opportunity for professional training and advancement; excellent retirement system; liberal sick leave, vacation and holiday benefits. Comparable education and training may be substituted for the stipulated requirements.

For further information or applications, please contact Dr. C. Earl Albrecht, Deputy Secretary of Health, P. O. Box 90, Harrisburg, Pa. Final date for filing applications is December 28, 1960, and examinations are scheduled for January 21, 1961.

tion to help develop a broad program for the school-age child. The salary offered is $6,717-$7,357, with generous fringe benefits. For details write to Madelyn N. Hall, Director, Division of Public Health Nursing, Department of Public Health, 500 South Broad St., 2nd Floor, Philadelphia 46, Pa.

Assistant Professor, Public Health Nursing—for N.L.N. accredited baccalaureate school of nursing, to teach public health nursing, including concurrent theory with clinical experience. Preparation desirable: graduate preparation in teaching public health nursing. Experience required: successful experience in generalized public health nursing. For further information write to: Dean, School of Nursing, University of Virginia, Charlottesville, Va.

Supervisors—generalized, for progressive combined nursing service. Active service related research. Opportunity for advancement within the organization. Preparation in public health nursing, three years' experience under good supervision and courses in principles of supervision required. Degree desirable. Apply to Marie L. Lowe, Director of Nursing, Instructive Visiting Nurse Association—City of Richmond, Department of Health, 223 South Cherry St., Richmond, Va.

Public Health Nurse III (District Advisory Nurse)—Give guidance and counseling to all public health nurses in a multiple-county area regarding community organization and relationships, program planning, public health nursing technics, records, and reporting. Responsible for inservice education program for local public health nurses and evaluation of nursing services. Salary range $5,700-$6,780, plus travel allowance. B.S. degree with major in public health nursing and three years' generalized experience as a public health nurse. Special requirement: registration or eligibility therefor as a registered nurse in Wisconsin; certification or eligibility for certification as a public health nurse in Wisconsin. Write Miss Ione M. Rowley, Director, Public Health Nursing, 119 Monona Ave., Madison 3, Wis.

Public Health Educator III—Initiate and develop community interest and cooperation in the organization of state-sponsored local programs for rehabilitation of the aged. Assist in development of rehabilitation training institutes on state and local levels. Prepare audiovisual materials relating to aging and rehabilitation. Will be responsible for development of reference and information library. Desirable qualifications: M.P.H. or master's degree in education or related field, plus two years' experience, preferably related to position. Salary starts at $6,060; maximum $7,200. Travel allowance, vacation, sick leave, retirement, group insurance plans. Write R. J. Siesen, Personnel Officer, State Board of Health, Madison 2, Wis.

The Pennsylvania Department of Health announces vacancies in the positions listed below. All positions are under the merit system. Excellent promotional opportunities and an extensive training program provide the basis for real professional growth. Comparable education and training may be substituted for the stipulated minimum requirements. For applications or further information for any of the following Pennsylvania vacancies, please write to Dr. C. Earl Albrecht, Deputy Secretary of Health, P. O. Box 90, Harrisburg, Pa. Applications should be postmarked not later than December 28, 1960.

Public Health Educator II—$6,390-$8,163—in the Division of Public Health Education, develops and administers a generalized program of health education in a region of several counties. Requires master's degree in public health education and two years' experience in the field of public health education, including one year with a voluntary or official public health agency.

Accident Prevention Specialist III—$6,716-$8,580—in the Division of Environmental Safety, to direct a state-wide accident prevention program. Requires master's degree in public health and two years' professional experience in accident prevention or safety work in the field of public health, including one year in a supervisory or administrative capacity.

Physical Therapist II—$5,268-$6,716—to direct a program of physical therapeutic activities in an assigned region. Requires two years' professional experience as a physical therapist, a bachelor's degree with major course work in physical therapy, and eligibility for license to practice physical therapy in Pennsylvania.

Public Health Nursing Consultants—$6,716-$8,580—to serve as a public health nursing consultant in the field of specialization in a state-wide nursing home program. Requires three years' experience in a generalized public health nursing program or in the field of specialization, including one year in a supervisory capacity, a B.S., and completion of an approved course in public health nursing, a course in teaching methods, and an advanced program of study in the field of specialization.

Nutritionist I—$5,268-$6,716—to serve as a nutritionist in an assigned region providing consultative and advisory nutritional services to state and related agencies. Requires one year's experience as a nutritionist or in teaching nutrition, and an M.S. in nutrition or related field.

Alcoholism Program Director—Challenging opportunity to develop and head up a new state alcoholism program centered around education and research pertaining to the causes, detection, and treatment of alcoholism and rehabilitation of alcoholics. Desirable qualifications: college graduate with a background in social work and a minimum of

three years' experience in a state or local alcoholism program. Administrative experience is a must. An M.P.H. would be desirable. Salary starts at $9,420; maximum $11,280. Civil service, vacation, sick leave. Travel with expenses paid. Write to Frederick H. Wentworth, M.D., Assistant Director, Ohio Department of Health, Room 306, Ohio Departments Bldg., Columbus 15, Ohio.

Field Consultant—Honolulu, Hawaii. Starting salary $7,200-$8,400. Applicants need a knowledge of applied statistics plus voluntary agency program experience. M.P.H. desirable but not primary requirement. Excellent employment benefits. Two-year contract required. Apply or inquire immediately. State Tuberculosis and Health Association, 550 Makapuu Ave., Honolulu 16, Hawaii.

Public Health Educator—to plan and carry out education programs on a county-wide basis in a well established County Health Department. Population 84,000. Liberal vacation and sick leave, hospitalization plan (one-half paid by county), retirement and longevity benefits. Salary $5,328-$6,072 per year. **Box HE-96,** Employment Service, APHA.

Public Health Educator—to plan and carry out community and mental health education programs for a County Health Department serving 188,000. Desirable qualifications: M.P.H. degree, plus two years' experience in general health education. Liberal vacation, sick leave, and other fringe benefits. Beginning salary $4,500-$5,040, depending on qualifications. Write Fred G. Pegg, M.D., Forsyth County Health Department, Winston-Salem, N. C.

Public Health Educator III (Dental Hygienist)—Assist in developing dental health programs for preschool and adult groups in a several county area. Coordinate dental health education activities with overall health education program. College graduation, a year of graduate training in an accredited school of public health, and two years' experience. Licensure or eligibility for licensure to practice dental hygiene in Wisconsin essential. Salary starts at $6,060; maximum $7,200. Civil service, vacation, sick leave, Social Security, and retirement benefits. Write R. J. Siesen, Personnel Officer, State Board of Health, 400 State Office Bldg., Madison 2, Wis.

Senior Psychiatric Social Work Consultant—for Colorado State Department of Public Health. Starting salary $598 per month. Headquarters Pueblo, Colo. Contact Dalton Roberts, Administrative Officer, Colorado State Department of Public Health, 4210 E. 11th Ave., Denver, Colo.

Crippled Children Services Supervisor—Supervise crippled and handicapped children's service unit in beautiful Fresno, cultural center of San Joaquin Valley (134,000 city, 360,000 county population), midway between San Francisco and Los Angeles, near mountains and ocean. $6,036-$7,548. Requires M.S.W. with specialization in medical, psychiatric or rehabilitation casework (or a closely related specialty), or college graduation and two years' social casework, one year in a supervisory capacity. Written examination may be taken in your area. Apply by December 2, to Edward W. Firby, Director of Personnel, Fresno County Civil Service Office, Room 101, Hall of Records, Fresno, Calif.

Public Health Chemist—in charge of new public health laboratory in new city Public Health Center; development opportunities; master's degree in chemistry and five years' broad experience in analytical laboratory, or bachelor's degree with chemistry major plus eight years' broad laboratory experience. Consultant to occupational health chemist. Public health chemistry and chemistry for city Police Department. Salary $660-$795 per month. Civil Service Commission, 309M City Hall, Minneapolis 15, Minn.

Principal Public Health Engineer—Las Vegas, Nev. Salary $647-$787 per month (appointment may be made above entrance salary). College degree in sanitary engineering or related field, and five years' responsible experience in the field. Liberal fringe benefits. Contact Nevada State Personnel Department, Carson City, Nev.

Sanitarian—County of San Luis Obispo (Calif.) Health Department. District responsibility for generalized sanitation program. Car available. Beautiful, mild, friendly California coastal community. Salary range $419-$505. Write County Civil Service Commission, 967 Osos St., San Luis Obispo, Calif.

Director of Environmental Health—to assume administrative supervision of total program in sanitation. Five-year-old County Health Department in county which has grown 125 per cent since 1950. Growth creates great challenge. Salary $9,923-$12,675; ten cents per mile travel; retirement, Social Security, free health insurance, generous vacation, and sick leave. Eligibility for Pennsylvania licensure plus seven years' experience, or M.P.H. or M.S. in sanitary engineering and five years' experience. Apply: William J. Meyer, M.D., Director, Bucks County Department of Health, 50 N. Main St., Doylestown, Pa.

Health Commissioner—County unit, serving 100,000, Hudson River valley, with headquarters at Kingston, N. Y. This is an established unit with a well trained staff of 50. Experience and training for health officer required. Salary $14,000, plus necessary travel. For details write to Mr. Harry Kaplan, President, Ulster County Board of Health, 15 Main St., Kingston, N. Y.

POSITIONS WANTED

On Box Numbers, Address APHA at 1790 Broadway, New York 19, N. Y.

Teacher and/or Public Health Physician—M.D.; Diplomate, A.B.P.M.; Fellow, A.C.P.M. Desire position with school of public health or medical school with public health course; public health administration or public health practices with health department. **Box PH-10,** Employment Service, APHA.

Sanitary Engineer—Age 37; masters' degrees Harvard and North Carolina. Experience in the United States, the Pacific and Central America; government adviser in environmental sanitation/sanitary engineering on national level for WHO, five years; consulting engineer for water resources and sanitary works, four years; design, construction, and operation of water supply and sewage systems; excellent command of Spanish. Minimum salary $10,200. **Box E-41,** Employment Service, APHA.

Laboratory Technician—A.A.S.; seven years' diversified experience; knowledge of EKG, BMR, typing. Female; single. Desire anything along similar lines outside of the United States. **Box L-77,** Employment Service, APHA.

Commercial Advertisements

All communications on the following commercial advertisements should be sent to Burneice Larson, Medical Bureau, Suite 605, 900 North Michigan Avenue, Chicago 11, Ill.

OPPORTUNITIES AVAILABLE

(a) Medical director, renowned industrial organization, occupational health program; some international travel to operations in Europe, South America, and Australia; top salary for topnotch physicians; East. (b) M.D. director, local health services—preventive medicine; beautiful college town on the lake; Midwest; to $18,000. (c) M.D. district health officer; Pacific northwestern community; to $15,000. (d) M.D. head, Medical Department; large pharmaceutical company, research division; prefer internal medicine; to $20,000; university city; North Central. (e) Registered nurse, industrial hygiene consultant; near San Francisco; $7,000-$8,500; plan, develop program of industrial nursing; travel throughout state. (f) Registered nurse, P.H., educational director; well coordinated program; Virginia seashore. (g) Registered nurse, assistant director, State Service Crippled Children; Southwest; to $7,000 plus; travel expenses. (h) P.H. nurses, supervisors and instructors, overseas assignments; must have degree; to $11,000; travel paid.

SITUATIONS WANTED

(a) Medical director, public health commissioner, background research in preventive medicine, aviation medicine, 35 years old; ten years experience in industry as head of Medical Department. (b) P.H. nurse administrator, M.P.H., Columbia, 12 years director, City-County Department.

BOOK REVIEWS

All reviews are prepared on invitation. Unsolicited reviews cannot be accepted.

FALLOUT: A STUDY OF SUPERBOMBS, STRONTIUM 90 AND SURVIVAL — Edited by John M. Fowler. New York, N. Y.: Basic Books (59 Fourth Ave.), 1960. 235 pp. Price, $5.50.

This book is claimed by the publisher to be "a balanced and understandable account of nuclear weapons and the multiple hazards they have created for mankind." It is questionable whether or not the book accomplishes the objectives of the publisher on either count.

The chapters by Machta and List (The Global Pattern of Fallout), Crow (Radiation and Future Generations), and Andrews (Radiation Accidents) are excellent and informative. Rosenfeld (Detection of Bomb Tests) has an especially good résumé with possible solutions. Holifield (Civil Defense) faithfully presents the discouraging picture of our civil defense program. If for no other reason this book should be read for these chapters.

The content of the remainder of the book is not adequate for an evaluation or understanding of the problem created by fallout. Oceanographic, soil, plant physiology, and animal physiology for example are considerations that are inadequately presented. Most glaring of all is the failure to present an evaluation of the real (or estimated) hazards to man from the low levels of radioactivity presently in his environment. Dr. Andrews' chapter is not an adequate substitute since he deals largely with high level exposures.

No place is it evident that the recent work of Hiyama, Scott Russell, Frederickson, Comar, Schuffelen, Cronkite, Jacobson, Loutit, and the many other busy investigators is considered. From internal evidence it is believed that the manuscripts designed to consider the critical disciplines these men embrace were prepared from data available from 12 to 18 months before the publication date. If so it is a serious fault. Research on fallout is moving much too fast for a pedestrian approach. Discarded concepts and hypotheses tend to freeze misinformation—via such widely read books as this—into our scientific folklore. Most unfortunately it is often the scientific folklore from which many public actions and policies are derived. Every effort should be exerted to prevent this.

The editor and the publisher unquestionably were governed by the best intentions when they ventured into the production of this book. Unfortunately the state of the discipline of radiation hygiene is changing so rapidly that it was fore-ordained that their manuscripts would be outdated by the time they reached the printers' hands. This book as a consequence does not replace as a source book the voluminous record of the Holifield hearings on the same subject taken in May, 1959.

JOHN H. RUST

THE HEALTH OF PEOPLE WHO WORK— Edited by Albert Q. Maisel. New York, N. Y.: National Health Council (1790 Broadway), 1960. 268 pp. Price, $4.50.

Unusual editorial success has been achieved in organizing and condensing the papers and discussions from the 1959 National Health Forum. Some readers will feel that there may have been a shift in emphasis on a particular item. Some will note omissions. All will feel that controversial points are not avoided and the pros and cons are calmly stated. Liberal recognition is given throughout to the individual participant.

This book will have value as a general reference for many years to come—in industry, labor, government, voluntary health agencies, insurance, education, and professions involved in occupational health programs. It ranges far, from pre-employment physicals to retirement, from costs to methods of payment, from engineering control to alcoholism, from medical ethics to health education, and from recruiting manpower to salary levels of occupational health personnel.

The reader interested in multiple facets of a particular point will find the index only partially helpful and will need to refer to the unusually complete Table of Contents and his own reading of a section.

For the reader seeking additional and individual help on a specific problem the book may provide a starting point. Addresses are given in the appendixes of National Health Council members and of forum participants, their organizations, and their titles.

CLYDE M. BERRY

MANUAL ON INDUSTRIAL WATER AND INDUSTRIAL WASTE WATER (2nd ed.)—ASTM Technical Publication No. 148-D. Philadelphia, Pa.: American Society for Testing Materials (1916 Race St.), 1959. 643 pp. Price, $11.00 (to members $8.80).

The second edition of this Manual has been enlarged and improved to conform to the rapid and major developments in water and waste treatment during the seven years that have elapsed since publication of the first edition. The preface to this edition states "that interest in the character of water is not confined to its suitability for process use, but continues after its final discharge from the plant." Thus the title of this edition recognizes this broadening interest and is now "Manual of Industrial Water and Industrial Waste Water." Part I is devoted to discussions not only of treatment of water for industrial uses but also of the required treatments of industrial wastes and the basic problems of stream sanitation. Technics for sampling to insure significant and accurate analytical data and procedures for flow measurements essential for adequate sampling are presented clearly and in detail.

The chapter on treatment of process water and of waste might be improved by separating the discussion of the two problems instead of treating them together. A clearer understanding would be available of the two problems which, while associated, must differ in basic principle as well as in details.

Part I, although necessarily brief, contains a wealth of detailed information and is an important and informative text which should be of great value to anyone concerned with the interpretation of the results of analysis of water and waste water and the application of these analyses to treatment operations and to problems of stream conservation.

The remainder of the book is devoted to the technical procedures recommended for the analysis of water and waste. These methods have been fully studied and the applications of each and the precision and accuracy to be expected are given. Many of the procedures are similar to those given in the present and the forthcoming editions of Standard Methods as published by the American Public Health Association.

The second edition of this Manual is a valuable addition to the literature on water and waste analysis and treatment.

F. WELLINGTON GILCREAS

MEDICINE AND SOCIETY IN AMERICA 1660-1860—By Richard H. Shryock. New York, N. Y.: New York University Press (Washington Square), 1960. 182 pp. Price, $4.00.

This interesting and informative little book consists of the four Ansong Phelps lectures that were presented by Professor Shryock to New York Univer-

sity in 1959. The topics of those lectures were:

I. Origins of a Medical Profession.
II. Medical Thought and Practice 1660-1820.
III. Health and Disease 1660-1820.
IV. Medicine and Society in Transition 1820-1860.

The first two chapters present, in roughly chronological order, the development of medical care over a period of 150 years in a pioneer society. The third chapter is of special interest to public health workers, since it gives us an understanding of the foundation on which our existing public health administration is based.

The fourth chapter covers the period of transition 1820-1860. This was the era of national expansion and had a great influence on our whole national social policies and subsequent advancement. It is the most interesting chapter in the book.

Each chapter has extensive references which are of special value to those who wish to study these matters more extensively. WILSON G. SMILLIE

PROBLEMS IN THE EVALUATION OF CARCINOGENIC HAZARD FROM USE OF FOOD ADDITIVES — Food Protection Committee-Food and Nutrition Board. Washington, D. C.: National Academy of Sciences-National Research Council (2101 Constitution Ave.), 1959. 44 pp. Price, $1.00.

This is an official publication of the National Academy of Sciences-National Research Council, prepared by an ad hoc committee on carcinogenesis for the standing Food Protection Committee which was constituted several years ago. It presents an extensive review of published data to support widely diverse viewpoints and interpretations. Obvious care has been used in the organization of material and the phrasing of generalizations. Selection of 95 references is based on the necessary documentation of the logical statement, rather than on any attempt to present a comprehensive report of the enormous literature. General considerations and principles cover the interspecies problems, differences of hazard depending upon route of administration and the matters of threshold dose and of co-carcinogens.

A practical chapter on Evaluation of Carcinogenicity of Food Additives has been added by men with experience, and provides a conservative guide for protocols in this increasingly needed phase of animal testing. The impossibility of proving carcinogenicity in man from animal tests or the complete freedom from this danger is frankly contrasted with the statistical concept of minimal hazard.

This report should be read and kept at hand by all those who have responsibilities for the attempts to employ new or unusual additives to foods.

E. L. SEVERINGHAUS

PRACTICAL FOOD INSPECTION (5th ed.) —By C. R. A. Martin. London, England: H. K. Lewis (P. O. Box 66, 136 Gower Street), 1959. 656 pp. Price, L3.3s net.

This being a British publication, it might be viewed by some as irrelevant to the American scene—as entertaining concepts and practices not applicable to food surveillance in this country. While it is true that it has local color, it embraces universally recognized principles modernized and expanded by recent technological advances and international experiences.

The author's attention to and inclusion of criteria for determining the wholesomeness of raw or fresh foods—meat, milk, poultry, fish, and vegetables—satisfies admirably a long-felt need for an integral association of the inherent wholesomeness of such foods in evaluating the wholesomeness of prepared foods and the dangers of foodborne disease. Though scientific terms relating to "Physiology and Comparative Anatomy," "Infectious Diseases,"

"Pathological Processes," and parasitism are used in the development of such criteria, the scientific detail is so handled as to be understandable and meaningful for the nonscientist inspector or reader.

This feature, supplemented by discussions of the nature of foods, both raw and processed, canned foods, food storage, chemical and other preservation of foods, and food bacteriology recommends this book not only to the food inspector but equally to the student, the food processor, and the restaurateur —even the housewife.

The legal and administrative references, notably British, and thus perhaps not readily applicable to food sanitation in this country, embrace points deserving of consideration in the ordination and administration of domestic programs for the protection of food wholesomeness and public health.

The author is to be commended for the comprehensive "Practical" treatment of a subject so important to human nutrition and health. L. R. DAVENPORT

EMPLOYMENT AND CONDITIONS OF WORK OF NURSES — International Labour Office. Geneva, Switzerland: La Tribune De Geneve, 1960. 176 pp. Price, $2.00.

The study reported in this monograph was an outgrowth of initiatives taken by the International Labour Office and the World Health Organization. Fifty-six countries or territories cooperated in completing the questionnaires circulated, and the information thus obtained was supplemented by material on the employment and conditions of work of nurses already in the possession of the International Labour Office and the World Health Organization.

The findings of the study which covered conditions of work—such as hours and remuneration; living conditions; health protection; social security; and career opportunities and social status—were discussed at a meeting of experts invited by the International Labour Office held in Geneva in 1958. The recommendations of this group include the following: That the responsible government authorities obtain more complete statistical information relative to the supply of nurses and the demands for nursing services; that hours of work for nurses should not exceed an average of 40 per week; that available nursing resources be more efficiently utilized; that scales of remuneration for the different categories of nursing personnel be raised to a level commensurate with their education, qualifications, responsibilities and duties; and that the International Labour Office continue to give attention to this field of study within its research and information programs.

In spite of its avowed limitations, this first effort to collate data on employment and conditions of work of nurses contains a wealth of material which will be useful to the nursing profession and health authorities in every country.

AGNES W. CHAGAS

ELEMENTS OF VITAL STATISTICS—By Bernard Benjamin. Chicago, Ill.: Quadrangle Books (119 West Lake St.), 1960. 352 pp. Price, $10.00.

This book brings up to date and considerably extends Newsholme's "Elements of Vital Statistics." It is, however, a completely new book. There is a fairly extensive discussion of the actual methodology of vital statistics. The detailed presentation of data is kept to a desirable minimum. Although the data, problems, and practices pertain to the experience of Great Britain, special attention has been given to corresponding developments in the United States. There are some excellent discussions of life table procedures and their utilization in various types of

disease studies. There are also some brief comments on field studies and the role of sampling. This is not a book on the theory of statistics, however, and no knowledge of statistical theory is needed to read it.

The coverage of topics is very comprehensive. After some excellent preliminary chapters on census, registration, fertility, mortality, and morbidity, there are some more specific chapters on the statistics of infectious diseases, tuberculosis, maternity and child welfare, cancer, mental health statistics, hospital statistics. An interesting chapter is that on general practitioner statistics.

While not actually a textbook of vital statistics, this book should prove a valuable adjunct to any such course. It should also be a useful supplement to any course in epidemiology. This reviewer can heartily recommend the book for anyone engaged in public health work who needs to understand statistical indexes and the vital statistics on which they are based.

JOHN W. FERTIG

CHOLERA—By R. Pollitzer. (With a chapter on World Incidence written in collaboration with S. Swaroop, chief, Statistical Studies Section, WHO, and a chapter on Problems in Immunology and an Annex written in collaboration with W. Burrows, professor of microbiology, University of Chicago.) WHO Monograph Series No. 43. Geneva, Switzerland: World Health Organization, Palais des Nations, or New York, N. Y.: Columbia University Press (2960 Broadway), 1959. 1019 pp. Price, $20.00.

Many pandemics of cholera have occurred in the world in the past, some have involved the United States, and for those who wonder of the importance of cholera for the present they are reminded that the disease accounted for 1,000 deaths in Calcutta in 1955.

Ordinarily one thinks of a monograph as a treatise, more or less complete, of one subject and as of relatively small size. This tome has some 1,000 pages and treats the subject in an up-to-date, extensive manner. The principal author was invited by the World Health Organization to prepare a monograph on cholera, and he and his collaborators are by experience and interest fully competent to deal with the various phases of the subject. There are 11 chapters each of which appeared as separate articles in the Bulletin of the World Health Organization. The chapter topics cover the principal facets of a disease, namely, history, microbiology (bacteriology, problems in immunology, bacteriophage investigations), pathology, clinical aspects (symptomatology, diagnosis, laboratory diagnosis, prognosis, treatment), epidemiology (world incidence), and prevention and control. Each chapter has an extensive bibliography culled from the past as well as more recent citations.

The volume should be of great interest to those with a leaning to subject matter dealing with the historical aspects of the great plagues and more particularly to health services whose responsibilities include cholera control. Additionally, the clinical aspects of the disease are fully covered.

FRANKLIN H. TOP

RESEARCH AND THE ULCER PROBLEM—By I. S. Blumenthal. Santa Monica, Calif.: Rand Corporation (1700 Main St.), 1960. 81 pp. Limited free distribution.

Dr. Blumenthal, who interestingly enough holds a doctorate degree in electrical engineering, has done a commendable job in analyzing the economic effects of peptic ulcer and ulcerative colitis in this country. He has also brought together from several sources data bearing on the relatively small amount of research funds devoted to these diseases and points up the knotty problems connected with the utilization of such funds.

The difficulties in arriving at the pre-

valence and incidence of ulcerative disorders have necessarily led to estimated rates with which one might disagree. The author, however, clearly describes his sources of information and the methodology involved. It is agreed that, if anything, these are underestimates. Dr. Blumenthal concludes that the total cost of peptic ulcer disease approximates $478,000,000 per year. Even if one were to take into account the the confidence limits of such an estimate, the magnitude of this problem in terms of economics is considerable.

This booklet is well written and illustrated with many interesting tables and diagrams. The bibliography provides many valuable sources of data. Anyone who has contributed to the $50,000,000 spent on antiacids alone each year in this country would enjoy this booklet. It is seriously recommended to anyone interested in the ulcerative diseases of the gastrointestinal tract.

JAMES P. DUNN

STREETWALKER — Anonymous. New York, N. Y.: Viking Press (625 Madison Ave.), 1960. 178 pp. Price, $3.50.

"Streetwalker" is written by an anonymous author and is a partial autobiography of a London prostitute. It is a beautifully written book and the story is told without sensationalism and in a sensitive and introspective manner. This is in no sense a professional treatise on the subject of prostitution but it is apparently a first-hand account of the life, attitude, and feelings of the prostitute herself. Since this is not a professional or scientific document, some people may question the reason for recommending this for public health workers to read. Certainly, public health is concerned with people. "Streetwalker" describes the dreadful loneliness of the prostitute. Many people will be able to understand the life of the prostitute better by reading this book.

JOHN R. PHILP

THE VIRUSES: BIOCHEMICAL, BIOLOGICAL, AND BIOPHYSICAL PROPERTIES. VOLUME 1—GENERAL VIROLOGY—Edited by F. M. Burnet and W. M. Stanley. New York, N. Y.: Academic Press (111 Fifth Ave.), 1959. 609 pp. Price, $16.50.

This book, the first of three volumes, contains an informative system of ten chapters allotted to biological, physical, and chemical properties of viruses, and their interactions at the cellular level.

In the opening chapter, the authors offer a forecast to later reading by sketching current concepts on synthesis and maturation of viruses, the role of infectious nucleic acids, and interactions between virus and host cell. The biochemical interactions between virus and host cell (bacterial, animal and insect), known and anticipated, are presented comprehensively and clearly by Cohen, Evans, and Bergold. Fraenkel-Conrat's and Schäfer's chapters deal with degradation and reconstitution of viruses and the functional importance of protein and nucleic acid in viral infectivity. The chapters by Schwerdt, by Gard and Maaløe, and by Schwachman and Williams give comprehensive accountings of physical properties of viruses and of their alteration by miscellaneous groups of agents. Elsewhere, discussions center around the mechanics and limitations of current immunological methods (Burnet), and the functions of virus and cells in the complicated "sex" (quotations mine) life of a virus (Luria).

This volume is required reading for many experimental biologists. These accomplished presentations are too comprehensive and too concentrated for a short review. The chapters are well organized, informative, often stimulating, and hard to follow (or digest) only occasionally. Despite some unevenness of topical arrangement and some repetition of the same material in different chapters, the messages are clear.

HERBERT A. WENNER

BOOKS RECEIVED

Listing in this column acknowledges the receipt of books and our appreciation to the senders. Space and the interests of readers will permit review of some, but not all, of the books listed.

CHILD GUIDANCE CENTRES-WORLD HEALTH ORGANIZATION PUBLICATION. D. Buckle and S. Lebovici. New York, N. Y.: Columbia University Press, 1960. 127 pp. Price, $4.00.

COURAGE TO CHANGE THE THINGS WE CAN. A Novel About Problem Drinkers. James Audain. New York, N. Y.: Pageant Press, 1960. 145 pp. Price, $2.50.

DELAYED EFFECTS OF WHOLE-BODY RADIATION. Bernard B. Watson. Baltimore, Md.: Johns Hopkins Press, 1960. 80 pp. Price, $4.50.

DIABETIC CARE IN PICTURES (3rd ed.). Helen Rosenthal and Joseph Rosenthal. Philadelphia, Pa.: Lippincott, 1960. 237 pp. Price, $4.50.

DIFFERENTIAL DIAGNOSES OF YAWS. C. J. Hackett and L. J. A. Loewenthal. World Health Organization Monograph. New York, N. Y.: Columbia University Press, 1960. 88 pp. Price, $3.25.

DISPENSATORY OF THE UNITED STATES OF AMERICA. Vol. 2—New Drug Developments. Arthur Osol and Robertson Pratt. Philadelphia, Pa.: Lippincott, 1960. 240 pp. Price, $9.00.

EDUCATORS GUIDE TO FREE SCIENCE MATERIALS. Mary Horkheimer Saterstrom and John W. Renner. Randolph, Wis.: Educators Progress Service, 1960. 298 pp. Price, $6.25.

FUTURE OF MAN. Predictions of a Biologist. P. B. Medawar. New York, N. Y.: Basic Books, 1960. 128 pp. Price, $3.00.

GRADUATE EDUCATION IN THE UNITED STATES. Bernard Berelson. New York, N. Y.: McGraw-Hill, 1960. 346 pp. Price, $6.95.

HANDBOOK OF MEDICAL TREATMENT (7th ed.). Milton J. Chatton: Sheldon Margen; and Henry Brainerd. Los Altos, Calif.: Lange Medical Publications, 1960. 570 pp. Price, $3.50.

HANDBOOK OF MICROBIOLOGY. Morris B. Jacobs and Maurice J. Gerstein. Princeton, N. J.: Van Nostrand, 1960. 322 pp. Price, $8.50.

HUMAN SIDE OF URBAN RENEWAL. Martin Millspaugh and Gurney Breckenfeld. New York, N. Y.: Ives Washburn, 1960. 233 pp. Price, $4.50.

INSULIN. British Medical Bulletin (Vol. 16, No. 3), 1960. London, England: British Council, Medical Department, 1960. pp. 175-264. Price, $3.25.

LABORATORY GUIDE TO VIROLOGY. Charles H. Cunningham. Minneapolis, Minn.: Burgess Publishing, 1960. 173 pp. Price, $3.25.

MEANING AND METHODS OF DIAGNOSIS IN CLINICAL PSYCHIATRY. Thomas A. Loftus. Philadelphia, Pa.: Lea & Febiger, 1960. 170 pp. Price, $5.00.

MEDICAL AND BIOLOGICAL RESEARCH IN ISRAEL. Edited by Moshe Prywes. New York, N. Y.: Grune and Stratton, 1960. 562 pp. Price, $8.00.

MISREPRESENTATION OF ARTHRITIS DRUGS AND DEVICES IN THE UNITED STATES. A Report to Committee on Arthritis Advertising. The Arthritis and Rheumatism Foundation. Ruth Walrad. New York, N. Y.: Arthritis and Rheumatism Foundation, 1960. 168 pp. Price, $3.50.

NAISSANCE ET DÉVIATION DE LA THÉORIE CELLULAIRE DANS L'OEUVRE DE THÉODORE SCHWANN. Marcel Florkin. New York, N. Y.: Pierre Beres, 1960. 244 pp. Price, $5.00.

NINE MONTHS TO GO. Robert McNair Mitchell and Ted Klein. Philadelphia, Pa.: Lippincott, 1960. 224 pp. Price, $3.95.

POST-BASIC NURSING EDUCATION PROGRAMMES FOR FOREIGN STUDENTS. Report of a Conference, Geneva, 1959. WHO Technical Report Series No. 199. New York, N. Y.: Columbia University Press, 1960. 47 pp. Price, $.60.

PREPAYMENT FOR HOSPITAL CARE IN NEW YORK STATE. Ray E. Trussell. New York, N. Y.: State of New York, Insurance Department, 1960. 383 pp. Price, $5.00.

PROCEEDINGS OF WORKSHOP ON HOSPITAL-NURSING HOME RELATIONSHIPS. Conducted under the joint sponsorship of American Hospital Association; American Medical Association; American Nursing Home Association; Blue Cross Commission, and U. S. Public Health Service. Chicago, Ill.: American Hospital Association, 1960. 60 pp.

PSYCHOLOGICAL AND MEDICAL ASPECTS OF THE USE OF NUCLEAR ENERGY. Symposium No. 6. New York, N. Y.: Group for the Advancement of Psychiatry, 1960. 64 pp. Price, $.75.

REVIEW OF MEDICAL MICROBIOLOGY (4th ed.). Ernest Jawetz; Joseph L. Melnick; and Edward Adelberg. Los Altos, Calif.: Lange Medical Publications, 1960. 376 pp. Price, $5.00.

ROLE OF THE PHYSICIAN IN ENVIRONMENTAL PEDIATRICS. Carl C. Fischer. New York, N. Y.: Landsberger Medical Books, 1960. 122 pp. Price, $5.50.

RYPINS' MEDICAL LICENSURE EXAMINATIONS (9th ed.). Edited by Walter L. Bierring. Philadelphia, Pa.: Lippincott, 1960. 805 pp. Price, $11.00.

STEPS IN THE DEVELOPMENT OF INTEGRATED PSYCHIATRIC SERVICES. Proceedings of the 36th Annual Conference, 1959. New York, N. Y.: Milbank Memorial Fund, 1960. Price, $1.00.

STUDY OF NONPROFESSIONAL PERSONNEL IN SOCIAL WORK—The Army Social Work Specialist. Fergus Thomas Monahan. Washington, D. C.: Catholic University of America Press, 1960. 201 pp. Price, $3.25.

THE TORCH. Wilder Penfield. Boston, Mass.: Little, Brown, 1960. 370 pp. Price, $4.75.

TOXINES ET ANTITOXINES DIPHTÉRIQUES. ÉTUDE IMMUNOLOGIQUE. Edgard H. Relyveld. New York, N. Y.: Pierre Beres, 1960. 164 pp. Price, $5.00.

VISION OF THE AGING PATIENT. Monroe J. Hirsch and Ralph E. Wick (Editors). Philadelphia, Pa.: Chilton, 1960. 328 pp. Price, $7.50.

WHAT PRICE MEDICAL CARE? Sir Earle Page. Philadelphia, Pa.: Lippincott, 1960. 160 pp. Price, $3.50.

A SELECTED PUBLIC HEALTH BIBLIOGRAPHY WITH ANNOTATIONS

Raymond S. Patterson, Ph.D., F.A.P.H.A.

"Basis for Informed Debate"—Insistent difficulties in modern medical care, medical education, and the broader aspects of public health administration are ably explored in a series of eight courageous papers addressed primarily to the understanding lay reader. Among the authors are distinguished members of our own association. You will find the presentations highly provocative and may want to commend them to the attention of those acquaintances of yours who dwell among that dwindling breed of Americans—men (women) who still can read and form valid judgments from what they read.

ANON. The Crises in American Medicine (A Special Supplement) Harpers Magazine 221.1325:121 (Oct.), 1960.

The Lethal Automobile — Though travel on scheduled airlines is still relatively more dangerous than either railroad or bus passenger travel, it doesn't begin to compare with the hazards of motoring on turnpikes (which are safer than other highways).

ANON. Gains in Aviation Safety. Statist. Bull. Metrop. Life Insur. Co. 41,8:9 (Aug.), 1960.

Americans Horizontal—Last year, that fiction the average American, suffered at least two acute ailments for which he was doctored and more than half the illnesses were respiratory. The year before, two of every five Americans enjoyed at least one chronic disease attack. These lump-sum figures

are broken down for you by age and sex in a table you may want to put to your own usage some fine day.

ANON. Major Aspects of American Morbidity. Statist. Bull. Metrop. Life Insur. Co. 41,8:1 (Aug.), 1960.

Nutritionists At Work — For a dozen years now, the New York State Department of Health has maintained an independent Bureau of Nutrition which has evolved its own progressive program of education, consultation and research, collaborating with other departmental bureaus, other state divisions and non-official health agencies. This story of a ground breaking venture should have something to suggest to other states (and big cities) in which nutritionists, if any be employed, are staff workers in maternal and child health services.

BROWE, J. H. The Bureau of Nutrition of the New York State Department of Health. New York State J. Med. 60,17:2735 (Sept. 1), 1960.

Synthetic Penicillin — From England come seven papers testifying to the effectiveness of the new synthetic penicillin (BRL 1241) against penicillin-resistant staphylococci. An accompanying editorial warns that much more clinical experience will have to be gained before the limitations of this new antibiotic can be assessed, but it agrees that the drug is an important forward step.

DOUTHWAITE, A. H., et al. A New Penicillin. Brit. M. J. 5200:687 (Sept. 3), 1960.

A Messy Thought — Among nineteen successfully resuscitated drowning victims, cyanosis in sixteen of them suggested that spontaneous recovery was most unlikely. The occurrence of vomiting in all but four of the nineteen did not seriously hinder the mouth-to-mouth resuscitation but must have made it decidedly unpleasant for the resuscitator. There is much else of interest here for the aspirant first-aider.

ELAM, J. O., et al. Resuscitation of Drowning Victims. J.A.M.A. 174,1:13 (Sept. 3), 1960.

Perils of Radiation—There is at least a modicum of good news here. Among the pregnant survivors of the Japanese atomic bombings there were no demonstrable increases in major congenital abnormalities, stillbirths or infant mortality. Cataract and leukemia were the chief somatic penalties. We are reminded however that the bombs were "small ones," and produced not a great deal of fall-out. With today's bigger and better bombs these somewhat hopeful findings may not prevail.

HOLLINGSWORTH, J. W. Delayed Radiation Effects in Survivors of the Atomic Bombings. New England J. Med. 263,10:481 (Sept. 8), 1960.

Large-Scale Test—In two of Philadelphia's ten health districts where polio had been conspicuous the year before, each child between six weeks and six years of age was given oral vaccine. Return visits scheduled at four-week intervals and community surveillance was maintained. No case of polio occurred in any of the vaccinated children or in the household of any, and most of the children developed antibodies satisfactorily.

POGANO, J. S., et al. Routine Immunization with Orally Administered Attenuated Poliovirus. J.A.M.A. 173,17:1883 (Aug. 27), 1960.

Fluoridation Progress Abroad—Little is being done by European governments about water fluoridation despite the fact that dental disease increases year-by-year. There is growing interest in the subject, however, as well as opposition of the same sort that has been exerted against any new or revolutionary measure designed to benefit health. On the other hand South America has not remained entirely indifferent, though economic difficulties

have hindered more than tentative steps in fluoridation.

Ross, W. S. Fluoridation in Europe (and) Chaneles, J. Fluoridation in South America. J. Am. Dent. A. 61,3:324 (Sept.), 1960.

Hospital Dust—In a British study of airborne bacteria in hospital wards, air contamination was found to bear no direct relation to pollution by detectable fibers. Dust control by such measures as oiling blankets might fix invisible fibers to the blanket surfaces but visible woolen lint and droplet nuclei do not seem to play a significant role the authors suggest.

Rubbo, S. D., et al. Vehicles of Transmission of Airborne Bacteria in Hospital Wards. Lancet II:7147, 397 (Aug. 20), 1960

Re Adolescence—Four papers—by a college physician, a nurse working with delinquents, a group of educators, and a school nurse—all seem to underscore the need for greater professional understanding of the adolescent turned loose in today's society. A point is made that, among all professional people, the public health nurse may have the unique and specialized knowledge and skills that will best help solve the burning torments of youth.

Schlesinger, A. M. Time of Weal or Time of Woe? (and three related papers). Nursing Outlook 8,9:496 (Sept.), 1960.

First Aid Note—Patients with lesser burns were treated by immersing the area in icewater (or covered by ice cold compresses). No infection occurred, and the treatment is inexpensive, humane and promptly effective.

Shulman, A. G. Ice Water as Primary Treatment of Burns. J.A.M.A. 173,17:1916 (Aug. 27), 1960.

No Lady Bountifuls Here — This down-to-earth story of a successful seven-year-old corporation created, managed, and staffed by handicapped people must be of major interest to all who have any concern whatever for practical rehabilitation. The company is not run sentimentally, the orders it receives are delivered on time and in first-rate condition, and the operatives are paid prevailing wages. How the shop and the special arrangements are designed is described in informative detail.

Thompson, D. M. A New Look at Abilities, Inc. Indust. Med. 29,9:413 (Sept.), 1960.

If additional information is desired regarding the articles listed in this bibliography, please communicate directly with the publications in which they appeared; the addresses are furnished for your convenience.

Brit. M. J. (British Medical Journal), British Medical Association House, 19 Tavistock Sq., London, W.C.1, England.

Indust. Med. (Industrial Medicine and Surgery), 605 N. Michigan Ave., Chicago, Ill.

Harpers Magazine, 49 East 33rd St., New York, N. Y.

J.A.M.A. (Journal of the American Medical Association), 535 N. Dearborn St., Chicago, Ill.

J. Am. Dent. A. (Journal of the American Dental Association), 222 N. Superior St., Chicago, Ill.

Lancet, 7 Adams St., Adelphi, London, W.C.2, England.

New England J. Med. (New England Journal of Medicine), Massachusetts Medical Society, 8 The Fenway, Boston 15, Mass.

New York State J. Med. (New York State Journal of Medicine), 750 Third Ave., New York, N. Y.

Nursing Outlook, American Journal of Nursing Company, 10 Columbus Circle, New York, N. Y.

Statist. Bull. Metrop. Life Insur. Co. (Statistical Bulletin of the Metropolitan Life Insurance Company, One Madison Ave., New York 10, N. Y.

CREDIT LINES

The Journal cannot furnish copies of items mentioned in Credit Lines. Please send requests to addresses given.

Growing Literature on Radiation

Public education on radiation has been advantaged with the publication of the summer issue of "Health" a quarterly bulletin of the Wisconsin State Board of Health. Entirely devoted to the subject of ionizing radiation, the issue starts with a definition and then covers the field including such topics as: fallout, atomic power plants, air, food and water surveys, industrial uses, radiation in biology and medicine, production of radioisotopes, radioactive wastes, genetics, and the respective roles of the Atomic Energy Commission and of state government. Few of the articles are more than two pages long. Illustrations are deftly used (including a photograph, with permission, from APHA's "Public Exposure to Ionizing Radiation"). Information on availability from Miss Linda E. Sanders, editor of the bulletin, Wisconsin State Board of Health, 1 West Wilson, Madison 2.

"Radiation Protection—Dental Radiography" in four pages summarizes what dentists and dental hygienists should do to protect themselves and their patients against unnecessary exposure to radiation during x-raying procedures. "The suggestions made reflect the status of present-day knowledge and the most practical methods of radiation protection," according to H. Jackson Davis, M.D., commissioner of health, Rensselaer County (N. Y.) Health Department, which publishes the booklet. Joseph A. Salvato, Jr., P.E., is director, Division of Environmental Hygiene, which supervises radiation protection for the department. Available, presumably free, from the Rensselaer County Health Department, 7th Ave. and State St., Troy, N. Y.

"Radionuclide Analysis of Environmental Samples" is a new laboratory manual of analytical methods that have been developed by the staff of the Robert A. Taft Sanitary Engineering Center or modified from methods developed by others for use with environmental samples. The manual also includes general statements on instrumentation. Revisions are expected as new methods are developed and additional information is obtained on instrumentation. Paul F. Hallbach is editor. Available free from the Robert A. Taft Sanitary Engineering Center, PHS, 4676 Columbia Parkway, Cincinnati 26, Ohio. Conrad P. Straub is chief, Radiological Health Research Activities, Division of Radiological Health at the Center.

"Radioactive Fallout in Time of Emergency: Effects upon Agriculture" reports the latest information on the topic and describes some of the things we can do in the event of nuclear attack to keep on producing food and other products necessary for existence. The report, published by the Agricultural Research Service, U. S. Department of Agriculture (ARS Special Report 22-55), begins with a description of the nuclear explosion itself. Explanations of the postexplosion problems of residual radiation and fallout, measurement of fallout, and protection against external and internal radiation then follow. A summary of effects of fallout

on agriculture points out that in spite of hazards of severe radiation injury to farm people and their livestock, radioactive contamination of food, feed, and water, and residual contamination in the soil which would result from a series of nuclear explosions, "research is providing the basic knowledge and specific means which can help to lessen the seriousness of these widespread effects. Knowing the radiation level in his area, the farmer can take several protective and remedial measures."

The glossary of terms helps, although the text as is appears to succeed in not losing the reader. Appendix contains a guide for shelter reserve food supply. Information on availability and price from the Agricultural Research Service, Washington 25, D. C.

OASI Since the 86th Congress

With the recent passage of laws amending coverage under the Social Security Act, benefits can be paid to disabled workers at any age, benefits are raised for some children, the amount of work required to get benefits is reduced, the survivors of workers who died before 1940 may be paid benefits, and a variety of other changes have gone into effect. These are all detailed in the Social Security Administration's "Changes in Old-Age, Survivors, and Disability Insurance Under the Social Security Amendments of 1960." Sold by the U. S. Government Printing Office, Washington 25, D. C.; no price listed. (The OASI Bureau has also added a film to its store of educational materials. Produced in cooperation with the American Medical Association and entitled "The Disability Decision," the movie is an attempt to answer some of the questions posed by physicians who are concerned with the government's disability benefits program. Social Security district offices will arrange to show the film upon request.)

Pooling Resources for Home Safety

A report is now available of the Conference on Home Accident Prevention sponsored jointly in May, 1960, by the St. Louis Home Accident Prevention Pool and the Health and Welfare Council of Metropolitan St. Louis. The booklet presents the papers given by such speakers as Philip Dykstra, manager, Home Safety Department, National Safety Council, and Godfrey Hochbaum, Ph.D., chief, Section on Behavioral Studies, Public Health Service. It also lists the participants and committees of the conference, and shows the organizational structure of the St. Louis Home Accident Prevention Pool. "HAPP represents a pooling of resources and common efforts toward common goals," and includes representatives from hospital administration, organized medicine, a union health plan, state PTA, architecture, industry, local health departments, a variety of voluntary health agencies, and volunteer groups. Available from the Health and Welfare Council of Metropolitan St. Louis, 417 North Tenth Street, St. Louis 1, Mo.; 63 pages; $1.

Health Insurance Education

Hospital Care Corporation — Blue Cross of Cincinnati, Ohio—applied to the Ohio Department of Insurance in May for an increase in rates to be charged the public in its hospital benefits plan. In developing its case, the Cincinnati plan prepared a simply written, amply illustrated document which shows how hospitalization rates are arrived at and discusses the basic elements underlying increases in hospital costs. The usual factors cited in rate increase applications, such as inflation, are well presented. The application's treatment of other factors such as the influence of the community and of the impact of a rising standard of

living on hospital costs and usage is noteworthy and effective.

One of the medical-economic facts of life in the Cincinnati area is that as the average cost of a day of hospital care has been going up, so has the average length of inpatient stay. As the application points out, it is incorrect to assume from this that all patients are staying longer in hospitals. "The cause . . . is an increasing percentage of patients with diseases that require longer periods of treatment . . . and a general decrease in the percentage of care being provided patients for diseases and conditions requiring short to moderate lengths of stay." Taking the annual days of hospital care per 1,000 members, 1955 through 1959, and the per cent of change from 1955 to 1959, by diagnosis, a 33.0 per cent increase has occurred in the number of inpatient days for those with a diagnosis of heart disease. On the other hand, there has been a 23.1 per cent decrease in the number of inpatient days for those with a diagnosis of infective and parisitic diseases.

The Appendix includes a description of the regional program "to assure judicious use of hospital facilities." A last word: the application succeeds in being statesman-like and unpretentious at the same time. Available in limited supply, gratis, from Hospital Care Corporation, 1365 William Howard Taft Road, Cincinnati 6. Earl H. Kammer is executive director.

The 1960 edition of "A List of Worthwhile Health Insurance Books" is available free from the Health Insurance Institute, 488 Madison Ave., New York 22, N. Y. In addition to books on health insurance currently available from commercial publishers or other sources, this 23-page publication lists organizations with a relationship to health and the financing of medical care, annual publications, and periodicals in the field of health insurance, and references on general insurance, gerontology, social security, and vital statistics.

(NEWS NOTE: the 1960-1961 National College Debate topic is: "Resolved: that the United States should adopt a program of compulsory health insurance for all its citizens." Numerous requests for information and materials are coming in to APHA headquarters. In reply APHA sends out "A Bibliography of Selected Materials Relating to the Issue of Compulsory Health Insurance Including General Reference for Background Readings in Medical Care.")

Nursing Homes: Operating Cost, etc.

In January, 1959, the Division of Hospital and Medical Facilities, PHS, issued a preliminary bibliography on the "Costs of Operating Nursing Homes and Related Facilities." Continuing requests for that report and the increasing number of studies in this area have led to a revision, now published as an annotated bibliography with the same title. (PHS Publication No. 754, 20 cents from the U. S. Government Printing Offices.) Data in the new report relate to costs—wherever possible, departmental costs—of providing care rather than to charges for care. A summary table highlighting the general range in costs among the different facilities shows that daily costs since 1957 vary from $3.38 in four Georgia nursing homes (having 100 beds and over) to $13.85 in a 42-bed nursing home unit of a New Jersey hospital providing rehabilitation and occupational therapy. One of the new sections in the revision contains references on accounting records.

A more general publication on nursing home management comes from the Catholic Hospital Association of the United States and Canada which held an institute on the subject in February. "The Administration of Long Term Care Facilities" is a collection of 17 reprints originally appearing in the association's

official journal "Hospital Progress." Included are articles on philosophy of operation, medical care, nutrition, physical and occupational therapy, dental care, mental health, safety, and financial management. The institute from which these derive "was an initial effort on the part of the Catholic Hospital Association in the field of the care of the aged." CHA, 1438 South Grand Boulevard, St. Louis 4, Mo.; $1.50.

The American Nurses' Association has issued "A Statement of Standards for Nursing Care in Nursing Homes" as a basis for improving patient care in these institutions. Skilled nursing care —including its preventive, curative and rehabilitative aspects—is a necessity in a nursing home, the ANA statement declares. In order to provide skilled nursing care, all nursing homes should provide direct supervision of nursing care by a qualified, registered professional nurse. According to the Public Health Service, only about one-third of the 25,000 nursing homes in this country have either a registered nurse or a practical nurse on their staff. The statement containing 17 points is available from the ANA, 10 Columbus Circle, New York 19, N. Y.

The Chronic Disease Program staff of the Public Health Service has prepared "Nutritional Food Service in Nursing Homes and Homes for the Aged: Selected References." In this annotated bibliography, nutritionists, nurses, and other personnel will find material on how adequate nutrition and satisfying diets will contribute to the health and comfort of the elderly and chronically ill. Includes recommended reading for nonprofessional workers also. PHS Publication No. 786 (No. 31 in the PHS Bibliography Series), U. S. Government Printing Office, Washington 25, D. C.; 15 cents.

Housing for the Aged: Two Reports

The New York State Division of Housing has given high priority to the study of providing adequate housing for the aged, and has published two reports on the subject. One is "Housing Requirements of the Aged—A Study of Design Criteria." In this no effort was made to perform original research. Rather, it is a review of reports and other literature available. Economic, sociological, psychological, and physiological needs of the aged were considered in the selection of criteria.

The intent of the other, "How to Provide Housing Which the Elderly Can Afford," is "to illustrate how an organization, a social minded group or a private entrepreneur could take advantage of existing government housing programs to help solve the problem with a relatively small investment." This report highlights the basic programs under which housing for the aged might be provided under New York State regulations and outlines the steps to follow in launching housing programs for the aged.

Both reports were orginally published in 1958. They have now been reprinted. The second one mentioned has been revised. Available through Richard W. Hill, Jr., Special Assistant for Research, New York State Division of Housing, Albany, N. Y. James Gaynor is commissioner of housing.

Worth Acquiring

Research is the topic of the Summer 1960, Pennsylvania's Health, a quarterly published by the State Health Department. The tone of this issue is set by the statement in the first article that "Research can no longer be considered a luxury for public health. It must be at the very root of good public health practice." C. Earl Albrecht, M.D., deputy secretary of the State Health

Department, writes from this point of view in "What is Research?" His article also points to some of the ways in which health departments can find help in developing a well-rounded research program. An inventory of research projects sponsored by the agency lends support to the idea that communities and the people living in them are as appropriate places to conduct research as laboratories and hospitals. Twenty current studies are listed covering the fields of environmental, occupational, school, and mental health, medical care, aging, chronic and communicable disease, nutrition, and others. Two of these projects, one on alcoholism and marital conflict and one on hearing in children, are described in greater detail than the others. Available free from Department of Health, Commonwealth of Pennsylvania, Harrisburg.

The "Dietary Aspects of Cardiovascular Diseases: Selected References" for the use of health department professional personnel, private physicians, professional personnel in voluntary health agencies and hospitals, and research workers, updates the June, 1958, publication, "Selected References on Diet and Heart Disease." Books, symposia, and audiovisual aids from many sources have been selected as well as significant papers from the 1958 and 1959 volumes of the American Journal of Clinical Nutrition, American Journal of Public Health, Circulation, GP (American Academy of General Practice), Journal of the American Dietetic Association, Journal of the American Medical Association, Journal of Chronic Diseases, and the Heart Bulletin. Sections deal with general information, calorie restriction, sodium restriction, fat control, and food composition tables in current uses. A flip-chart format is used to separate these categories. PHS Publication No. 755, 1960. Free to professional workers, from Heart Disease Control Program, Bureau of State Services, PHS, Washington 25, D. C.

"Obedience Means Safety for Your Child," prepared by the Committee on Accident Prevention, American Academy of Pediatrics, takes off from the premise that "Discipline—especially the discipline of obedience—is a real, primary protection to a child, and an efficient, workable safety tool for a parent." The pamphlet explores several ideas of discipline for safety, and gives eight advices on command. As to punishment, "You will do well to render . . . some kind . . . a spanking is quick, often effective." Sections also include: The Cause of Disobedience, A Child's Appetite for Love, Language of Love, and Automobile Safety. Bruce W. Everist, M.D., is committee chairman. Available from the AAP, Evanston, Ill.

The Arthritis and Rheumatism Foundation has put out "A Lesson In Arthritis" for school children to teach them basic facts about the disease and to help overcome "public ignorance and apathy concerning this serious national health problem." The booklet traces the history of arthritis from aboriginal times to the present and "story-tells" about the four major forms of the disease: rheumatoid arthritis, osteoarthritis, gout, and rheumatism. The 16-page booklet, designed to look like a school copy book with marginal illustrations, is available for 10 cents from the Arthritis and Rheumatism Foundation, 10 Columbus Circle, New York 19, N. Y., or from local ARF chapters.

(NOTE: ARF has also collaborated with the Public Health Service, along with the cooperation of numerous specialists and national organizations, to produce "Strike Back at Arthritis." This 45-page booklet is designed to serve as an aid to physicians in prescribing treatment. Therapeutic exercises that can be done at home are described. PHS Publication No. 747, U. S. Government Printing Office, Washington 25, D. C.; 40 cents.)

NEWS FROM THE FIELD

WHO News

Appointments at WHO Headquarters

Early in 1961 Fred Grundy, M.D., now professor of preventive medicine, Welsh National School of Medicine, Cardiff, will become the fourth assistant director-general of WHO. In this recently created post, he will be responsible for the Divisions of Public Health Services, of Health Protection and Promotion, and of Education and Training (see A.J.P.H. 'Sept., 1960, p. 1464). Among Dr. Grundy's publications are two standard textbooks of preventive and social medicine. He was also a co-author, with J. M. Mackintosh, M.D., of "The Teaching of Hygiene and Public Health in Europe," one of the WHO monograph series. He has been consultant to the WHO Expert Committee on Postgraduate Training in the Public Health Aspects of Nuclear Energy and was adviser to the government of Ceylon on the consolidation of the island's public health law. Dr. Grundy is also a barrister-at-law.

Louis Verhoestraete, M.D., M.P.H., has been named director of the Division of Health Protection and Promotion at WHO headquarters in Geneva. This division was recently created in the reorganization of WHO's headquarters services. Its units deal with cancer, cardiovascular diseases, dental health, mental health, nutrition, and social and occupational health. Dr. Verhoestraete was formerly chief, Health Promotion Branch, Pan American Sanitary Bureau in Washington, D. C., to which he was assigned in 1954. He first joined WHO in 1947 as a consultant in pediatrics with the United Nations Children's Fund (UNICEF) in Paris. In 1950 he became chief, Maternal and Child Health, at WHO's Geneva headquarters.

More News from the Congo

The need to reactivate preventive health services as soon as practicable in the Republic of the Congo, especially at the district and village level, is stressed in a recent report on health activities of the United Nations operations in the Congo. The services would help to insure that the gains of recent years are not lost, especially in the field of control of insect-borne diseases, the report indicates. It was prepared by J. S. McKenzie Pollock, M.D., senior representative of the WHO in the Congo and health consultant to the chief of the UN Civilian Operations there. (Note: The "other Congo," Congo Republic, formerly French territory, is where the WHO Regional Office for Africa is located, at Brazzaville.)

Small, localized outbreaks of smallpox are said to be widespread. In some areas, primary vaccination and revaccination have not been carried out for a considerable time, and in others no vaccinations have been done for the last two years. Apparently lack of supervisory personnel is hindering the vaccination service. The French government, however, has placed four mobile teams, consisting of one doctor and one technician each, at WHO's disposal. These will assist in operating preventive services on the district and village level. And intensive training courses for Congolese staff operating water purification plants have been started by WHO and bilateral assistance personnel.

Looking to the future, WHO has offered its world-wide recruitment service to the Congolese government to obtain medical staff from outside the country to staff the basic medical services of the country, on a scale of minimum requirements, until Congolese

doctors can gradually take over. A program is under way for a substantial number of Congolese medical assistants to take courses overseas to enable them to qualify as doctors of medicine.

Milk: Hygiene, Cultural Aspects

Second Report. Joint FAO/WHO Expert Committee on Milk Hygiene, updates the 1957 publication of a previous joint committee. It includes discussions of staphylococcal poisonings, streptococcal infections, the newly recognized milk transmission of tick-borne encephalitis, and the hygienic control of milk products with special consideration of the problem in warm countries. Of two annexes to the report, one is a code of principles concerning milk and milk products, drawn up by the FAO. The other describes some of the lesser known milk products of Europe and Asia, ranging from dried reindeer milk to Koumiss, an alcohoic beverage made from mare's milk. Committee chairman was Dr. F. W. Barker, Research and Development Division, National Dairy Products Corporation, Oakdale, N. Y. WHO Technical Report Series 1960, No. 197, 55 pages. Columbia University Press, 2960 Broadway, New York 27, N. Y.; 60 cents. Also in French and Spanish.

A Look at 1960 Traineeships

The Public Health Service reports that as of July, 1960, Title I public health traineeships had been awarded to 622 persons from funds appropriated for fiscal year 1960. Three hundred and seventy-seven were awarded through public or nonprofit schools eligible for the grants, and 245 directly by PHS to individuals whose applications had been accepted by such schools.

Forty-seven colleges and universities (including four schools of public health) which prepare registered nurses for beginning positions in public health nursing received grants. These schools awarded 325 traineeships, 61 of which were awarded by the four schools of public health. Grants were also made to 11 schools of public health for awards to individuals other than nurses. Fifty-two students benefited from these grants.

Of the 245 trainees getting direct grants, 176 chose schools of public health for their training and 69 chose other graduate schools.

Professional categories of the 622 trainees are as follows:

Physicians	51
Nurses	325
Sanitary Engineers	55
Sanitarians	35
Sanitation Field (Other)	12
Laboratory Personnel	12
Statisticians	12
Health Educators	47
Nutritionists	18
Medical Social Workers	1
Dentists	17
Dental Hygienists	2
Veterinarians	15
Miscellaneous	20

Of the 622 trainees, 490 were under the age of 35, 122 were between the ages of 35 and 45, and 10 were over the age of 45. Three hundred and thirty-six had had no previous experience in the field of public health; 175 had had two years' or less; 95 had over two but no more than five, and 16 had more than five years' experience.

Trainees came from each of the 50 states, the District of Columbia, Guam, Puerto Rico, and the Virgin Islands.

The Demise of a Word

The International Society for the Welfare of Cripples changed its name in September to the International Society for Rehabilitation of Disabled. The action was taken at its eighth world congress.

In his column in the New York Times, Howard A. Rusk, M.D., immediate past-president of the society, said that the change illustrates a developing

philosophy. "The paternalistic approach of protection and welfare is being replaced by the dynamic concept of opportunity through rehabilitation. . . . In the future we will read and hear the word 'cripple' less and less. Perhaps some day it will be obsolete as both a word and concept." (A proceedings of the eighth congress will be available in December from society headquarters, 701 First Avenue, New York, N. Y., at $2 a copy; discounts on volume orders.)

National Health Council in the News

The National Health Council has launched a project to develop uniform accounting principles and definitions to assist national voluntary health agencies in strengthening existing accounting systems, to provide methods for comparing fiscal experiences, and to enable these agencies to respond to requests of government, philanthropies, other agencies, and the contributing public, with information to reflect on a comparable basis their financial pictures.

The project is planned and financed by 15 health agencies, including a majority of the well known fund-raising groups, under the direction of a special committee headed by Howard A. Withey, a member of the Council of the American Institute of Certified Public Accountants.

Other NHC news: The ninth annual National Health Forum, March 13-16, 1961, New York City, will be on "Better Communication for Better Health." Plans are to hold three pre-Forum Workshops in various parts of the country. These will consider communication among the health professions, and communication between the health organizations and the general public. Pre-Forum Workshops are expected to provide a basis for the discussion at the Forum itself. Granville W. Larimore, M.D., deputy commissioner, New York State Department of Health, is chairman of the 1961 Forum Committee. Marion W. Sheahan, deputy general director, National League for Nursing, and APHA president is on the committee.

Attention is also called to NHC's Health Careers Program Exhibit, otherwise known as the Graham Table Top Flexhibit: four colors, 3′ 4″ x 5′ 10″ open, 30″ x 40″ closed, 6 pounds, heavy duty display board; pictures can be changed for local use. $15.65. Descriptive folder available from NHC, 1790 Broadway, New York 19, N. Y.

CDC Facilities Are Dedicated

The recently completed headquarters facilities of the Public Health Service's Communicable Disease Center in Atlanta, Ga., were dedicated in September. Its six new buildings are on a 15-acre campus.

One of the speakers at the ceremony, Representative John E. Fogarty, Democrat of Rhode Island and chairman of the House Health Appropriations subcommittee, took the occasion to solicit public support for mass screening clinics, improved nursing-home standards, organized home-care programs and environmental health plans. He also urged more widespread use of the "rich, life-saving gifts" that are resulting from the work of researchers.

In addition to the need for reducing the time lag between the discovery of new knowledge and its application, greater cooperation at all community levels is required to achieve community health goals. "The big health issues of today are so broad they cannot possibly be solved by any one group or profession," he said. "The people who are going to get sick as well as the people who will be paid for curing them" should have a voice in planning mass community programs. They should have "a real voice, not just token representation—on a lot of other health

issues." For example, "I'd like to see health officers' jobs be just as dependent on the approval of the consumers of health services as they are on the approval of organized medicine."

APhA Proposes New Approach

The American Pharmaceutical Association filed a statement in September with the Food and Drug Administration on FDA's proposal to amend labeling requirements of prescription legend drugs. In it, APhA recommends the use of a standardized "official brochure" for each prescription drug to assist pharmacists in discharging their professional responsibilities as drug consultants to prescribers. APhA proposes that this brochure be distributed through a central nongovernmental agency approved for the purpose by FDA. The APhA is also of the opinion that the purposes intended by the FDA-proposed regulations would be achieved if all Journal advertisements and promotional materials would refer the reader to the "official brochure" for details.

While agreeing in principle to the FDA proposal (A.J.P.H. Oct., 1960, News from the Field), APhA contends that the increase of information on the package or on package inserts would not solve the problem of getting the desired information to the physician. The prescriber seldom sees the product or its packaged content, the statement notes. "It is the pharmacist who has physical possession of the product, its container or wrapper, and any written, printed, or graphic material accompanying such an article."

Filling in the Unknowns: Dental

In September, the Division of Oral Hygiene, North Carolina State Board of Health, and the Department of Epidemiology, School of Public Health, University of North Carolina, began a study of the natural history of dental diseases in North Carolina.

The State Health Department's "Health Bulletin" (August) points out that while there are a vast amount of data in the literature on dental diseases, particularly on dental caries in school-age children, "very little of the data can be defended as being representative of even this small age group. Dental epidemiology at the present can describe 'life-histories' of dental conditions only by fitting together bits and pieces of data from many different sources and, even then, finds areas that are unknown."

Project personnel will make what is said to be the first known description of dental conditions, both normal and pathological, that are representative of a large state population. They expect to gain new knowledge of the principal dental health problems in the state and new insight into the associations of pertinent family social variables with dental diseases.

Local and state public health dentists will visit a stratified random sample of households, give complete dental examinations to all members of the household, and by questionnaire obtain data on various biological and social characteristics of the household members.

Swimming Pool Testing Service

The National Swimming Pool Institute and the National Sanitation Foundation have joined forces to develop standards and a testing program for swimming pool equipment and materials. NSF will grant its Seal of approval to items which meet its requirements. The NSF has conducted a similar program in the food equipment and service field for the past 15 years. In the new program the first piece of equipment to be tested was the diatomite earth filter.

NSF's public health committee for

swimming pools includes representatives from the Public Health Service, the APHA, the Conference of State Sanitary Engineers, the Conference of Municipal Public Health Engineers, the National Association of Sanitarians and others. Chairman is Clarence W. Klassen, director, Division of Sanitary Engineering, Illinois Department of Public Health. W. O. Baker, Los Angeles, Calif., is vice-president and coordinator of standards for the NSPI. Walter F. Snyder is executive director, National Sanitation Foundation, Ann Arbor, Mich.

When the Live Vaccine Is Ready . . .

Upon the heels of the Surgeon General's announcement that live poliovirus vaccine is suitable for use in the United States, the Public Health Service has formed a Surgeon General's Committee on Poliomyelitis Control. In addition to the APHA the following organizations are represented on it:

American Academy of Pediatrics;* American Academy of General Practice;* American College of Preventive Medicine; American Hospital Association, American Medical Association;* American Nurses Association; American Pharmaceutical Association; AFL-CIO; Association of State and Territorial Health Officers;* Association of State and Territorial Public Health Educators; Association of State and Territorial Public Health Laboratory Directors; Children's Bureau;* Conference of State and Territorial Epidemiologists; Council of State Governments; Department of Defense; General Federation of Women's Clubs; National Congress of Colored Parents and Teachers Association; National Congress of Parents and Teachers Association; National Foundation;* National Health Council; National Medical Association, Inc.; Pharmaceutical Manufacturers' Association. The Control Committee is expected to hold its first session in December or January.

Production of the oral vaccine will not be full-scale before mid-1961. Meanwhile, the PHS will continue to promote the widest possible use of the Salk vaccine.

* These organizations are represented on a committee which is to develop the basic agenda for the first meeting of the Committee on Poliomyelitis Control.

A Metamorphosis Begins: PHS

The Public Health Service took major steps in reorganizing itself in September with the establishment of four new divisions in the Bureau of State Services.

Air pollution work, formerly divided into medical and engineering units, will be handled by a Division of Air Pollution, with Vernon G. MacKenzie as chief, and Richard A. Prindle, M.D., as deputy chief.

Once separately administered activities are being concentrated in a new Division of Occupational Health headed by Harold J. Magnuson, M.D., director of the Service's occupational health program for the past four years.

Functions of the Division of Public Health Nursing of the Bureau of State Services, and of the Division of Nursing Resources of the Bureau of Medical Services, have been consolidated and will be carried out by a Division of Nursing, with Margaret Arnstein as chief.

A Division of Dental Public Health and Resources, directed by Donald J. Galagan, D.D.S., brings into one unit the activities of what were the State Service's Division of Dental Public Health and the Medical Service's Division of Dental Resources.

These organizational changes would appear to be possible moves in the direction of establishing Bureaus of Community Health and Environmental Health as recommended by the Surgeon General's study group on mission and

organization of the PHS. (A.J.P.H. Oct., 1960, News from the Field.)

Upon the recommendation of the study group, the PHS has also established a National Center for Health Statistics which brings together the U. S. National Health Survey and the National Office of Vital Statistics, the major PHS activities concerned with measuring the health status of the nation and with identifying significant associations between characteristics of the population and health-related problems. The center will supplement but not supplant the statistical work which will continue as an integral part of particular PHS programs. Forrest E. Linder, Ph.D., director of the National Health Survey since 1956, is acting director of the center.

Follow-up: White House Conference

A new National Committee for Children and Youth has been appointed as a successor group to the President's National Committee for the Golden Anniversary White House Conference on Children and Youth. It will make a continuing evaluation of the follow-up activities of the 1960 Conference throughout the country and issue a report in 1965.

Mrs. Thomas Herlihy, Jr., who is president of the Welfare Council of Delaware and was on the President's National Committee for the Conference, is chairman. Vice-chairmen are Dr. Luther H. Foster, president, Tuskegee Institute, and Katherine B. Oettinger, chief of the Children's Bureau; Dr. Lyle W. Ashby, deputy director, National Education Association, is treasurer; secretary is Sylvia Carothers, director, Florida Children's Commission. Isabella J. Jones is director of the committee.

Training Opportunities

The National Council to Combat Blindness, Inc., "The Fight for Sight," has set March 1, 1961, as the closing date for receipt of completed applications for full-time research fellowships, grants-in-aid, and summer student fellowships for the 1961-1962 period. NCCB finances basic and clinical research in ophthalmology and related sciences.

Except where it is essential earlier, notification may be expected by applicants for full-time research fellowships and grants-in-aid in July with August 1 as the commencement date for the project. Applicants for summer student fellowships will be notified in May. Forms from Secretary, National Council to Combat Blindness, Inc., 41 West 57th Street, New York 19, N. Y.

The Public Health Service and the Office of Civil and Defense Mobilization offer four national courses to train medical and health personnel for emergency services. Three, for hospital administrators, registered nurses, and environmental health personnel, are being offered for the first time. Courses scheduled are:

1. Health Mobilization Program for Emergency Hospital Management, December 4-9, 1960. OCDM Eastern Instructor Training Center, Brooklyn, N. Y. (Course carries professional endorsement of the American Hospital Association.)
2. Nursing Aspects of Health Mobilization, April 23-28, 1961, OCDM Staff College, Battle Creek, Mich.
3. Environmental Health Aspects of Health Mobilization, April 23-28, 1961, Battle Creek, Mich. (Courses 2 and 3 held concurrently to permit joint sessions in some subjects.)
4. Health Services Aspects of Health Mobilization, May 7-12, 1961, OCDM Eastern Instructor Training Center, Brooklyn, N. Y.

All courses cover basic civil defense concepts, current information on biological, chemical, and radiological warfare, and community disaster planning. Tuition and housing are free and approximately one-half the necessary travel expenses can be reimbursed through OCDM student training expense funds.

Applications through State Civil Defense Directors, and further information from State Health Departments or Civil Defense offices.

The Atomic Energy Commission has made eight fellowships available for the academic year 1961. Awardees will receive advanced training and on-the-job experience in the field of industrial medicine, particularly in relation to the atomic energy industry. The program consists of an academic year and an in-plant training year. The fellowships are open to men and women physicians who are United States citizens, who have been graduated from an approved college of medicine at least two years prior to beginning tenure of the fellowship, and who are licensed to practice medicine in one of the states or territories. Successful candidates will be required to have a full FBI background investigation and to be cleared by the AEC before receiving an award. Applications for the academic year 1961-1962 should be filed before January 1, 1961. Complete information from AEC Fellowships in Industrial Medicine, Atomic Energy Project, University of Rochester, School of Medicine and Dentistry, Rochester 20, N. Y., Attention: Dr. Henry A. Blair.

Still forthcoming in the 1960-1961 program at New York University Post-Graduate Medical School, Institute of Industrial Medicine (with the NYU College of Engineering) are courses for persons already trained in one of the physical, engineering, biological, or medical sciences: Air Pollution, November 28-December 9, 1960; Medical and Public Health Control of Ionizing Radiation, March 6-17, 1961; Radiation Hygiene Measurements, April 17-May 12; a course in Radiochemical Analysis is to be offered in 1961-1962. Complete information from the associate dean, 550 First Avenue, New York 16, N. Y.

The first Advanced Institute on Hospital Dental Service (Nov. 29-Dec. 1, Chicago) will include among its subjects: dental care for outpatients, homebound patients and nursing home patients, and the relation of group purchase programs for dental care to hospital dental practice. Sponsors are the American Dental Association and the American Hospital Association. The Advanced Institute is an outgrowth of basic institutes held during the past four years in various cities to teach general principles and standards for the administrative and professional organization of dental services in hospitals. Further information: Gerard J. Casey, D.D.S., Secretary, Council on Hospital Dental Services, American Dental Association, 222 East Superior Street, Chicago 11, Ill.

PERSONALS

Philip R. Beckjord, M.D., Dr.P.H.,* formerly surgeon, 7th Logistical Command, U. S. Army, Korea, has retired from active Army service and is now professor of public health practice, Tulane University Medical School, New Orleans, La.

Lt. Colonel David H. Beyer, MC, USAF (M.P.H.), formerly chief, Aviation Medicine Division, headquarters Pacific Air Forces, Hickman Air Force Base, Hawaii, is now chief, Flight Medicine Branch, School of Aviation Medicine, Brooks Air Force Base, Tex.

Morris Brand, M.D.,* medical director, Sidney Hillman Health Center, New York City, has been appointed to the Surgeon General's Advisory Committee on Occupational Health.

Carl Robert Brewer, Ph.D., formerly chief, Research Division, U. S. Army Chemical Corps Research and Development Command, Washington, D. C., is now chief, Research Grants Branch, Division of General Medical Sciences, NIH, Bethesda, Md.

Kurt W. Deuschle, M.D.,† formerly assistant professor of public health and preventive medicine, Cornell University Medical College, is now professor and chairman, Department of Community Medicine, University of Kentucky Medical School, Lexington.

* Fellow.
† Member.

CLIFTON O. DUMMETT, D.D.S., M.P.H.,* chief, Dental Service, VA Hospital, Tuskegee, Ala., has received the National Dental Association's "Outstanding Dentist of 1960" award.

ROY F. FEEMSTER, M.D., Dr.P.H.* director, Division of Communicable Diseases, Massachusetts Department of Public Health, has retired after nearly 30 years of service.

CARRIE E. HALL, R.N., M.P.H.,† formerly instructor in epidemiology, Department of Tropical Medicine and Public Health, Tulane University, New Orleans, is now nurse epidemiologist, Chronic Disease Unit, Division of Epidemiology, Public Health Research Institute of the City of New York.

JOHN RODERICK HELLER, M.D.,* formerly director, National Institute of Cancer, Bethesda, Md., is now president, Memorial Sloan-Kettering Cancer Center, New York City.

LUIS L. LACOURT, M.D., M.P.H., formerly assistant chief, Bureau of Tuberculosis Control, Puerto Rico Department of Health, is now medical director of the tuberculosis program, Nevada State Department of Health.

REMA LAPOUSE, M.D., M.P.H.,* formerly assistant professor of epidemiology and psychiatry, Tulane University School of Medicine, New Orleans, is now head, Mental Disease Unit, Division of Epidemiology, Public Health Research Institute of the City of New York.

D. JOHN LAUER, M.D.,* formerly medical director, Jones and Laughlin Steel Corporation, Pittsburgh, Pa., is now medical director, International Telephone and Telegraph Company, New York City.

LISEL LOWEN, M.P.H.,† formerly director of health education, Greenwich (Conn.) Health Association, is now public health educator, Rockland County Child Injury Prevention Project, New York State Department of Health.

JAMES M. MATHER, M.D., D.P.H.,* is now assistant dean, Faculty of Medicine, University of British Columbia, Vancouver. He continues as head of the Department of Preventive Medicine.

STANLEY MEYERS, formerly executive director, Parents and Friends of Mental Retarded Children of Bridgeport, Inc., is now director, Community Services Division, Office of Mental Retardation, Connecticut State Department of Health, Hartford.

JOHN R. NEWBROUGH, Ph.D., formerly Public Health Service research fellow in community mental health, Massachusetts General Hospital, Harvard Medical School, is now senior assistant scientist, Mental Health Study Center, NIMH, Langley Park, Md.

COLONEL JOHN A. NORTON, MC, USAF,† formerly commander, 823rd Medical Group, Homestead Air Force Base, Fla., is now chief, Education and Training Division, Medical Operations, USAF Aerospace Medical Center, Brooks Air Force Base, Tex.

LELAND W. PARR, Ph.D.,* professor emeritus in residence, George Washington University School of Medicine, Washington, D. C., and one of the founders of the Association of Teachers of Preventive Medicine, has retired.

HAMLET C. PULLEY, M.D., M.P.H.,* formerly a regional medical coordinator, is now assistant director, California State Department of Public Health, a new position in which he will direct activities of the Divisions of Preventive Medical Services, Environmental Sanitation, Community Health Services, and Dental Health.

MERRILL S. READ, Ph.D., formerly visiting professor, Department of Biochemistry and Nutrition, Virginia Polytechnic Institute, and from 1956 to 1959, chief, Irradiated Food Branch, U. S. Army Medical Research and Nutrition Laboratory, Fitzsimmons General Hospital, Denver, is now director of nutrition service, National Dairy Council, Chicago.

WALTER G. RICE, M.D., since 1955 professor of pathology, is now dean, Medical College of Georgia, Augusta.

FRED B. ROGERS, M.D., M.P.H.,* formerly associate professor of preventive medicine and public health, is now professor of preventive medicine and epidemiology, Temple University School of Medicine, Philadelphia, Pa.

HARRY M. ROSE, M.D.,* chairman, Department of Microbiology, College of Physicians and Surgeons, Columbia University, delivered the Eleventh August B. Wadsworth Lecture of the New York State Association of Public Health Laboratories, at the Division of Laboratories and Research, New York State Department of Health, Albany, in October.

PAUL F. O'ROURKE, M.D., M.P.H., who recently completed graduate study in public health administration at the University of California School of Public Health, Berkeley, is now health officer, Imperial County Health Department, El Centro, Calif.

LILLIAN M. SNYDER,* formerly director, Department of Social Work, University of Maryland Hospital, is now research associate, Maryland Commission on Alcoholism, Baltimore.

* Fellow.
† Member.

H. O. SWARTOUT, M.D., Dr.P.H.,* for more than 12 years health officer, County Health Department, San Luis Obispo, Calif., has retired.

AARON TRUBMAN, D.D.S., M.P.H.,† has been named supervisor, Public Health Dentistry Section, Mississippi State Board of Health, Jackson.

RUTH H. WEAVER, M.D.,* director, Division of Medical Services, Board of Public Education, Philadelphia, Pa., has retired.

J. ALLEN YAGER, M.D., M.P.H.,† formerly in the private practice of internal medicine in Paterson, N. J., is now medical director, Joseph E. Seagram & Sons, New York, N. Y.

DEATHS

EARL W. BRIAN, M.D.,† physician and a member of the State Board of Health, Raleigh, N. C., on August 1 (Medical Care Section).

HUGH J. DEENEY, JR.,† predoctoral student, Oregon State College, Corvallis, Ore. (Unaffiliated).

EDWARD HOCHHOUSER,† director emeritus, Altro Health and Rehabilitation Services, New York, N. Y., July 7 (Public Health Education Section).

TIMOTHY F. MURPHY, M.D.,* retired, Washington, D. C. (Statistics Section).

WILLIAM H. PICKETT, M.D., M.P.H.,* of Gainesville, Fla. (Health Officers Section).

EDWIN G. RAMSDELL, M.D.,† president, Westchester County (N. Y.) Board of Health (Unaffiliated).

CONFERENCES AND DATES

American Public Health Association, Eighty-Ninth Annual Meeting, Detroit, Mich., November 13–17, 1961.

State and Regional Public Health Meetings—November, December, 1960, and January, 1961:

Connecticut Public Health Association. Grantmoor Inn, Meriden, November 17.

Mississippi Public Health Association. Robert E. Lee Hotel, Jackson, December 7-9.

Meetings of Other Organizations:

American Association of School Administrators. San Francisco, Calif. January 25-28, 1961.

American Medical Association. Council on Foods and Nutrition, Washington, D. C. November 30.

American Medical Association. Statler Hotel, Washington, D. C. November 29-December 2 (Clinical Meeting).

American Medical Writers' Association. Morrison Hotel, Chicago, Ill. November 18-19.

American Occupational Therapy Association. Statler Hilton Hotel, Los Angeles, Calif. November 11-18.

Industrial Hygiene and Air Pollution Conference. University of Texas, Austin, Tex. December 3.

International Conference of Social Work, 10th. Rome, Italy. January 8-14, 1961.

National Association for Mental Health. Denver, Colo. November 17-19.

National Citizens Committee for the World Health Organization. Palace Hotel, San Francisco, Calif. November 2.

National Conference on Water Pollution. Washington, D. C. December 12-14.

National Social Welfare Assembly. New York, N. Y. December 5-6.

National Social Welfare Assembly—National Committee on the Aging. New York, N. Y. December 6-7.

National Swimming Pool Institute. Adolphus and Baker Hotels. Dallas, Tex. January 7-10, 1961.

Planned Parenthood Federation of America. New York, N. Y. November 15-16.

United Cerebral Palsy Associations. Saxony Hotel, Miami Beach, Fla. November 19-21.

United Community Funds and Councils of America, Conference of Community Welfare Council Leaders. Biennial. Pittsburgh, Pa. January 12-13, 1961.

White House Conference on Aging. Washington, D. C. January 9-13, 1961.

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Basic Principles of Healthful Housing. 2nd ed. reprinted 1950. 34 pp. $1.00

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Paper edition $1.00
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Control of Malnutrition in Man. 1960. 124 pp. .. $1.50

Diagnostic Procedures for Virus and Rickettsial Diseases. 2nd ed. 1956. 578 pp. $7.50

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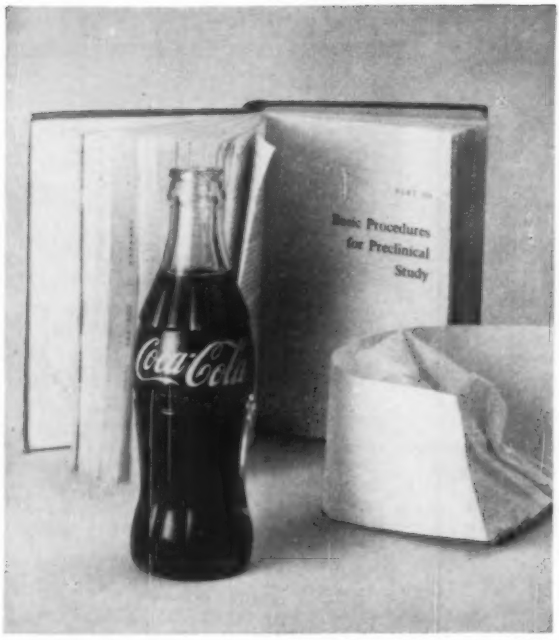

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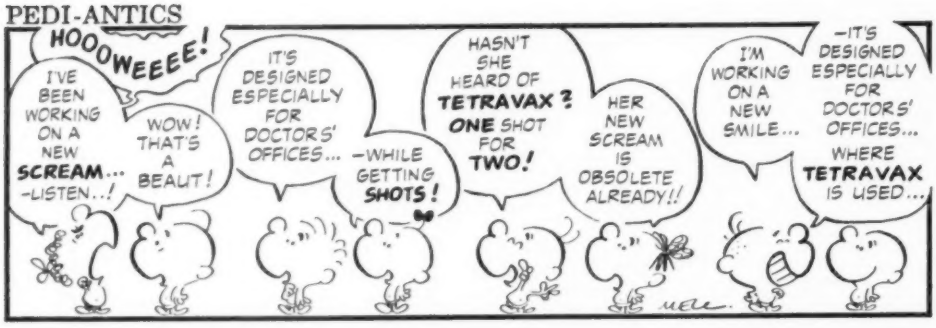
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